Report on Annual Groundwater Monitoring, Area IV, 2018

Santa Susana Field Laboratory Ventura County, California

Prepared for:
United States Department of Energy

Prepared by:
North Wind, Inc.

NORTHWIND INCORPORATED

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PROFESSIONAL CERTIFICATION

Report on Annual Groundwater Monitoring, Area IV, 2018
January 1 through December 31, 2018
Santa Susana Field Laboratory
Ventura County, California

February 2019

This Annual Groundwater Monitoring Report has been prepared by a team of qualified professionals under the supervision of the senior staff whose seal and signature appears below.

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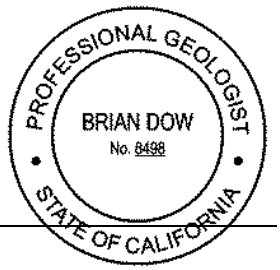

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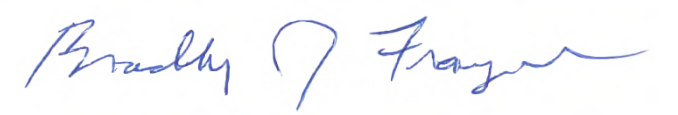

Approved by
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Project Manager

EXECUTIVE SUMMARY

This report summarizes the United States Department of Energy (DOE) groundwater monitoring activities conducted during 2018 at Area IV within the Santa Susana Field Laboratory (SSFL), located in Ventura County, California. This is the fourth annual report prepared by DOE to satisfy the California Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC), requirements to report on annual groundwater monitoring at SSFL. The annual report has been developed by North Wind, Inc., (North Wind) in collaboration and with contributions from CDM Federal Programs Corporation (CDM Smith), and includes water quality data collected from administrative Area IV, Northern Buffer Zone, and off-site wells. For simplicity, data from these areas reported herein are referred to as "Area IV."

Groundwater samples were collected in 2018 by North Wind and CDM Smith. The following groundwater monitoring activities were conducted within Area IV, and are summarized in this report:

- Water quality samples were collected during Q1 2018 pursuant to the Site-Wide Groundwater Monitoring Program (Haley & Aldrich 2010b).
- Water quality samples were collected during Q1 2018 to support the Groundwater Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFI) Program (CDM Smith 2015a).
- Scheduled 2018 samples were collected with the exceptions identified in this report.
- Water level measurements were collected in the first, second, third, and fourth quarters of 2018, and groundwater elevation contours for 2018 were prepared and are presented in this report.
- The groundwater interim measure (GWIM) action at the Former Sodium Disposal Facility (FSDF) was continued during 2018 (CDM Smith 2018e).
- Monitoring wells were installed in May and June and sampled in June and July within the Hazardous Materials Storage Area (HMSA) (CDM Smith 2018f).
- A near-surface groundwater aquifer test was conducted within the HMSA on May 17 and 21, 2018 (CDM Smith 2018c).
- Eight bedrock coreholes were drilled 53 to 63 feet below ground surface (bgs) at the FSDF as part of an investigation of groundwater contamination in near surface bedrock fractures, May 25 to June 8, 2018 (CDM Smith 2018d). One corehole (C-21) was incorporated into the FSDF GWIM action (CDM Smith 2018e).
- Sampling of groundwater seep probes in the Northern Buffer Zone and on Brandeis property was conducted June 18 to 27, 2018 (CDM Smith 2018b).
- Well maintenance was performed.

There are no Regulated Unit or Post Closure Permit (PCP) monitoring program requirements for Area IV.

Exceptions to the Site-Wide Groundwater Water Quality Sampling and Analysis Plan (WQSAP) are summarized in this report. Water supply well WS-07 was sampled by National Aeronautics and Space Administration (NASA) as part of its groundwater investigation work.

Exceptions Noted during 2018 Activities

Exceptions to the Site-Wide WQSAP are discussed in the report and included wells that could not be sampled due to being dry; wells containing insufficient water for sampling; or a well obstruction due to

partially removed Flexible Liner Underground Technologies (FLUTe) devices. Stabilization readings for some wells were recorded at intervals greater than five minutes based on the time requirement to exchange water in the flow-through cell due to the low flow rate. For two wells, the low-flow stabilization criterion was not met based on the water level drawdown exceeding 0.3 feet.

A groundwater sample was collected from RD-34B using a pump placed immediately above the existing borehole obstruction (167 feet bgs), and low-flow sampling procedures were followed.

A groundwater sample from RD-57 could not be obtained due to a downhole obstruction caused by a partially removed FLUTe sampling device. The lid on this well has been welded shut to restrict access.

Reporting limits for all analytes were met except for vinyl chloride, 1,2-dichloroethane, carbon tetrachloride, and gasoline-range organics (GRO). These differences are discussed in detail in Section 3.4 and are considered sufficient to meet project requirements.

A resampling event was conducted in August 2018 to verify one or more analytes at wells RD-33A, RD-33C, RD-59A, and RD-59C and the resample data were presented in a revised Q1 report (North Wind 2019). Trespassers had tampered with wells RD-33A and RD-33C and thus the wells were resampled to help assess whether the tampering had affected sample results. Strontium-90 results from RD-59A and RD-59C were suspected to be anomalous and false positives and thus the wells were resampled for confirmation purposes. This annual report includes the Q1 analytical data and the August 2018 resample data for comparison purposes.

Sample Results Evaluation

As discussed in detail in Section 4.2.3, impacted areas for the main contaminants of concern (COCs) trichloroethene (TCE), tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride, 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethane (1,1-DCA), 1,4-dioxane, carbon tetrachloride, total petroleum hydrocarbons (TPH), nitrate, and tritium had results consistent with those seen in previous years. No new areas of impact have been identified from this 2018 sampling event. All other wells impacted by COCs will continue to be monitored as required by the Site-Wide WQSAP.

There are also analytes of interest that are not identified as COCs. These include perchlorate, 1,2,3-trichloropropane (1,2,3-TCP), formaldehyde, n-nitrosodimethylamine (NDMA), and fluoride. Based on 2018 results as well as past sampling events, no areas of impact to groundwater from these analytes are indicated.

A review was conducted in Section 4.2.4 regarding all analytes that were detected for the first time in 2018 as well as whether each concentration is the new maximum concentration value for each affected well. For analytes that were above any associated SSFL screening criteria in a particular well, and if groundwater flow trends indicate it, sampling for those analytes will be performed in 2019. New first-time detected analytes will also be sampled for in 2019 if they were not able to be sampled in 2018.

Section 4.2.4 presents the analytes reported in the wells sampled during Q1 2018. The data presentation is grouped into three categories based on whether (1) there were new analyses conducted at that well, (2) an analyte was reported for the first time in a well and that concentration is now the new maximum value, or (3) the analyte has been detected in the well previously but the new value is now the new maximum concentration.

For the first category, no new analytical methods were performed on samples from existing wells.

For the second category, various analytes were reported for the first time in multiple wells sampled during Q1 2018 and these concentrations are now the new maximum values for those wells and analytes. All radionuclides detected for the first time in various wells were below the SSFL screening criteria. New maximum concentrations in this category above the associated SSFL screening criteria values include:

- GROs in wells DD-141, PZ-105, and RD-54A; and
- Diesel-range organics (DRO) in wells DD-54A and RD-63.

For the third category, various analytes were reported in different wells sampled in Q1 2018. These results are not first time detects but they are now the new maximum values for these analytes and these wells. New maximum values for previously detected analytes exceeding the associated SSFL screening criteria values include:

- 1,1-DCE in well RD-23;
- 1,4-dioxane in well DS-46;
- DRO in wells PZ-105, RD-14, and RD-96;
- Trans-1,2-dichloroethene in well RD-65;
- Trichloroethylene in wells C-8, DD-144, and RD-23;
- Total gross alpha in wells DD-141 and RD-63; and
- Strontium-90 in well RD-98.

Analytes that were above any associated SSFL screening criteria in a particular well will be sampled in 2019. New first time detected analytes will also be sampled for in 2019.

August Resample Results

On 02 August 2018, it was discovered that trespassers had tampered with wells RD-33A and RD-33C; the lids of the protective casings had been pried open and the pump in RD-33C was missing. Well RD-33B and other wells in the area (PZ-097 and DD-139) were checked to verify that they had not been tampered with or damaged. The protective lids of RD-33A and RD-33C were repaired, new well caps were installed on the casings, and both wells were locked. On 21 and 22 August, RD-33A and RD-33C were resampled for the full analytical suite that is currently being tested as part of the DOE site-wide sampling program. Nothing anomalous was discovered and thus provides a line of evidence that tampering had not affected the quality of Q1 samples collected from these wells.

Analytical results of Q1 groundwater samples showed concentrations of strontium-90 (Sr-90) in the dissolved fraction of samples collected from off-site wells RD-59A and RD-59C. No detection of Sr-90 was reported in the total fraction of these samples and Sr-90 has not previously been detected in these wells. The detection of Sr-90 in dissolved results, not including total results, indicates that the dissolved results may be false positives. The project laboratory was contacted to investigate if the results were potentially false positives due to laboratory error. After reevaluating the results, it was determined that there was no laboratory error; however, it was noted that the detections of dissolved Sr-90 were extremely low. The level of dissolved Sr-90 detected in RD-59A was 0.363 picoCuries per liter (pCi/L) and the minimum detectable concentration (MDC) was 0.320 pCi/L. The Sr-90 concentration in the dissolved fraction of the sample from RD-59C was 0.464 pCi/L and the MDC was 0.260 pCi/L. In comparison, the State of California maximum contaminant level in drinking water for Sr-90 is 8.0 pCi/L. Concentrations this low are at the statistical boundary of the 95% confidence interval. Further evaluation of the results at

the 99% confidence interval showed that the detections could be statistically non-detect and false positives.

On 20 August 2018, wells RD-59A and RD-59C were resampled for total and dissolved Sr-90 to verify that the Q1 detections were in fact false positives. Samples were sent to Test America, with split samples sent to General Engineering Laboratories in Charleston, SC, for independent verification. The samples from Test America went through a Level IV validation and all resampling results for Sr-90 (total and dissolved) were non-detect at both laboratories.

Conclusions

The 2018 sampling activities met the objectives stated in the Site-Wide Groundwater Monitoring Program and Site-Wide WQSAP except where noted above and in the body of this report. In general, sample results were consistent with historical results. Any newly detected sample results will be monitored in future sampling events. Areas of impact to groundwater from COCs remained consistent and will be further evaluated with the 2019 results to see if any changes are required.

The resampling results from two independent laboratories indicating non-detect Sr-90 (total and dissolved) for wells RD-59A and RD-59C provide a conclusive line of evidence confirming that the Q1 Sr-90 results at these wells collected in February 2018 were anomalous and false positives. The resampling results from RD-33A and RD-33C did not indicate increased contaminant concentrations resulting from the vandalism.

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,1,1-TCA	1,1,1-trichloroethane
1,2,3-TCP	1,2,3-trichloropropane
1,2-DCA	1,2-dichloroethane
22 CCR	Title 22 California Code of Regulations
bgs	below ground surface
Boeing	The Boeing Company
CDM Smith	CDM Federal Programs Corporation
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
DOE	United States Department of Energy
DPH	Department of Public Health
DRO	diesel-range organics
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
FLUTe	Flexible Liner Underground Technologies
FSDF	Former Sodium Disposal Facility
GRO	gasoline-range organics
GWIM	groundwater interim measure
GWRC	Groundwater Resources Consultants
HMSA	Hazardous Materials Storage Area
LUFT	Leaking Underground Fuel Tank
MCL	maximum contaminant level
MDC	minimum detectable concentration
MDL	method detection limit
mg/L	milligrams per liter
mrem/yr	millirems per year
MSL	mean sea level
MWH	Montgomery Watson Harza
NASA	National Aeronautics and Space Administration
NDMA	n-nitrosodimethylamine

North Wind	North Wind, Inc.
PCE	tetrachloroethene
pCi/L	picocuries per liter
PCP	Post-Closure Permit
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RMHF	Radioactive Materials Handling Facility
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
SMCL	secondary maximum contaminant level
Sr-90	strontium-90
SSFL	Santa Susana Field Laboratory
SWGW RBSL	site-wide groundwater risk-based screening level
TCE	trichloroethene
TPH	total petroleum hydrocarbons
trans-1,2-DCE	trans-1,2-dichloroethene
VOC	volatile organic compound
WQSAP	Water Quality Sampling and Analysis Plan

Report on Annual Groundwater Monitoring, Area IV, 2018

Santa Susana Field Laboratory Ventura County, California

1. INTRODUCTION

This report summarizes the groundwater monitoring activities conducted during 2018 by the United States Department of Energy (DOE) within Area IV of the Santa Susana Field Laboratory (SSFL) located in Ventura County, California (Figure 1). Previous annual reports have reported groundwater monitoring activities performed for the entirety of SSFL, including areas administered by The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA) at administrative Areas I, II, III, IV, and undeveloped land both to the north and south. DOE is submitting data for wells within Area IV for which it has responsibility under the 2007 Consent Order for Corrective Action (Department of Toxic Substance Control [DTSC] 2007). This report describes groundwater monitoring activities that occurred from January through December 2018 within administrative Area IV, the Northern Buffer Zone, and off-site wells located to the north and west of Area IV. For simplicity, administrative Area IV, Northern Buffer Zone, and off-site wells associated with Area IV are termed "Area IV" in this report.

This report contains Area IV information relative to DOE activities only and as such has been modified to reflect regulatory compliance requirements for Area IV. There are currently no Post-Closure Permit (PCP) Regulated Unit Monitoring Program requirements or Leaking Underground Fuel Tank (LUFT) requirements for Area IV.

Area IV groundwater monitoring activities described in this report were the result of implementation of the December 2010 Site-Wide Water Quality Sampling and Analysis Plan (WQSAP; Haley & Aldrich 2010b), and site-wide activities in support of the DOE Area IV Groundwater Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFI) Program (CDM Smith 2015a).

1.1 Site Description

The SSFL is located approximately 29 miles northwest of downtown Los Angeles, California, in the southeast corner of Ventura County (Figure 1). The SSFL occupies approximately 2,850 acres of hilly terrain, with approximately 1,100 feet of topographic relief near the crest of the Simi Hills. Figure 1 shows the geographic location and property boundaries of the site, as well as surrounding areas. The site is divided into four administrative areas (Areas I, II, III, and IV) and includes undeveloped land both to the north and south. Most of Area I and all of Areas III and IV are owned by Boeing. The United States Environmental Protection Agency (EPA) Identification Number for Areas I and III is CAD093365435. Area II is owned by the federal government and administered by NASA along with a portion of Area I. The EPA Identification Number for Area II is CA1800090010. Boeing owns the entirety of Area IV. The EPA Identification Numbers for Area IV are CAD000629972 and CA389009001. Ninety acres of Area IV were leased to the DOE, which also owns facilities in Area IV. The northern and southern undeveloped lands of SSFL were not used for industrial activities and are owned by Boeing.

1.2 Regulatory Background

Prior to submission of this annual report, groundwater sampling activities for Area IV were reported along with results from Areas I, II, and III. As a result, previous annual reports were intended to fulfill the requirements of multiple regulatory programs being implemented at SSFL. These include requirements addressed in the PCP monitoring programs (Regulated Unit Programs) for Areas I, II, and III approved by the California EPA DTSC, the Site-Wide Groundwater Monitoring Program approved by DTSC, and LUFT monitoring program overseen by DTSC. There are no Regulated Unit or LUFT requirements for Area IV and thus they are not addressed in this document.

The content of this report is in compliance with the December 2010 Site-Wide WQSAP (Haley & Aldrich 2010b). The Site-Wide Groundwater Monitoring Program is prescribed by the Site-Wide WQSAP.

1.3 Objectives

Area IV groundwater compliance requirements are presented in the Site-Wide Groundwater Monitoring Program. The objective of this report is to document compliance with that program. The scope of this report includes the following:

- Executive summary of significant findings;
- Summary of monitoring programs and activities conducted during the calendar year;
- Summary of maintenance inspections of monitored wells, if any;
- Summary of modifications made to monitoring equipment during the calendar year, if any;
- Summary of deviations from the Site-Wide WQSAP, if any;
- Discussion of significant events that may influence the occurrence and movement of groundwater;
- Summary of results of laboratory analyses of water samples;
- Summary tables indicating monitoring parameter results that lie outside of historical range for each monitoring location;
- Summary of constituent concentrations at wells that exceed SSFL groundwater screening reference values (SSFL screening criteria);
- Summary of outstanding issues and/or follow-up work;
- Contaminant plume maps with isoconcentration contours for specific regulated units or areas;
- Water level data, hydrographs, and groundwater elevation contour maps;
- Contaminant concentration versus time plots and a discussion of evident trends; and
- Results of quality assurance/quality control sampling and analysis and assessment of data quality, including accuracy, precision, and completeness with associated laboratory and data validation reports.

1.4 Report Organization

The remainder of this report is organized as follows:

- Section 2 provides a description of the site geology and hydrogeology.
- Section 3 provides a summary of the activities performed during this reporting period.
- Section 4 presents the results of field work and analytical testing.
- Section 5 presents planned activities for 2019.
- Section 6 provides references.

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2. SITE GEOLOGY AND HYDROGEOLOGY

2.1 Geology

The SSFL is located in the Western Transverse Ranges physiographic province of southern California. The province's geology and physiography reflect at least 70 million years of geologic history. The sedimentary rocks in the portion encompassing SSFL range from coarse-grained conglomerates and sandstones to fine-grained siltstones and shale. The geologic history of the Western Transverse Ranges is complex and involves several distinct episodes of deformation involving tectonic extension, rotation, compression, and shearing. In the vicinity of SSFL, this has caused the Western Transverse Ranges to rotate more than 90 degrees clockwise. This complex geologic history is reflected in multiple fold, fault, and fracture orientations in the vicinity of SSFL.

The Chatsworth Formation underlies much of the province and is exposed across most of SSFL (Figure 2). It is a turbidic sandstone with interbedded shale, siltstone, and conglomerate approximately 6,000 feet thick and more than 65 million years old. As a result of geologic folding, the Chatsworth Formation dips moderately (typically 25 to 35 degrees) to the northwest at SSFL, along the south limb of the Simi Valley syncline. Detailed geologic mapping in the site vicinity was performed to augment published geologic maps, resulting in the subdivision of the Chatsworth Formation into upper and lower units (Montgomery Watson Harza [MWH] 2009). The lower formation is exposed in southeastern SSFL and dips northwest beneath the remainder of the site. The upper Chatsworth Formation is exposed across much of the remainder of the site and has been subdivided further into stratigraphic packages consisting of coarse- and fine-grained members. Numerous steeply dipping to near-vertical faults offset this stratigraphy. Fault gouge and fracturing, ancillary to faults, are observed at some locations.

Unconsolidated deposits at SSFL include alluvium, artificial fill, and thin soils over bedrock. The alluvium generally consists of silty sand and occurs in topographic lows and along ephemeral drainages. Areas with 5 to 30 feet of alluvium cover more than 300 acres of SSFL, or about 11 percent of the site.

2.2 Hydrogeology

Groundwater occurs at SSFL in alluvium and weathered and unweathered bedrock (Montgomery Watson 2000; MWH 2009). First-encountered groundwater may be observed in any of these media under water table conditions. For regulatory purposes, near-surface groundwater is defined to occur within the site's unconsolidated deposits (e.g., alluvium) and shallow weathered bedrock, whereas deep groundwater, referred to as “Chatsworth Formation groundwater,” occurs in the unweathered bedrock. The near-surface groundwater may be perched or vertically continuous with deeper groundwater.

The boundaries of the mountain groundwater system encompassing SSFL include where the Simi Hills meet the floor of the Simi and San Fernando valleys, and where groundwater tends to discharge to seeps and phreatophytes along several surrounding canyons. The base of the active groundwater flow system occurs at the boundary between fresh and connate groundwater, assumed to occur at approximately sea level. The upper boundary of the mountain groundwater flow system is the regional water table and localized perched water tables. Hydrogeologic boundaries internal to the groundwater flow system include areas of groundwater discharge to seeps and phreatophytes, pumped wells, and various boundary effects along faults and geologic contacts.

Portions of the Chatsworth Formation comprise locally transmissive aquifer units. These units generally consist of the fractured sandstone members of the upper Chatsworth Formation, many of which are several hundred feet thick. Separating the major sandstone units are a series of relatively thin shale and siltstone members that typically behave as aquitards.

The arrangement and geometry of the hydrogeologic units are controlled by geologic contacts, folding, and faulting. Faults truncate permeable zones and fractures, juxtapose different units and fold orientations, and form low-permeability boundaries and zones of enhanced fracturing. Together, these structures result in a complex three-dimensional distribution of hydrogeologic units and anisotropic permeability that influence directions and rates of groundwater flow. Major faults subdivide SSFL into several large blocks, which are further subdivided by shale beds.

The SSFL water table is a subdued reflection of the topography, which, relative to the surrounding valleys, presents as a large groundwater mound that is maintained by rainfall recharge. Distinct differences in groundwater head are observed across fine-grained units and faults that impede groundwater flow. Groundwater moves from areas of recharge toward pumping wells and downward and outward toward hill slope seeps and the surrounding lowlands. The direction of vertical flow is downward at most site locations. Insight into the pattern of SSFL groundwater flow has been provided through the development and use of a representative three-dimensional groundwater flow model (CDM Smith 2018a).

3. REPORTING PERIOD ACTIVITIES

The reporting period for this report covers the 2018 calendar year, from January 1, 2018, to December 31, 2018. Groundwater samples were collected as part of the Area IV Site-Wide Groundwater Monitoring Program and to support the DOE Groundwater RFI Program.

The Site-Wide Groundwater Monitoring Program – December 2010 Site-Wide WQSAP (Haley & Aldrich 2010b) was implemented to fulfill the groundwater monitoring program specific to Area IV at SSFL. The following activities stipulated by the Site-Wide WQSAP were conducted during the reporting period:

- Measurement of groundwater levels at all accessible program wells.
- Collection and submission of groundwater samples from select wells for laboratory analysis.
- Data validation, data analysis, and database management.

The goals of the groundwater RFI (CDM Smith 2015a) and data gaps identified in the RCRA Facility Groundwater Remedial Investigation Report (CDM Smith 2018a) formed the basis for work conducted during 2018. These goals were:

- Collection of water levels and groundwater samples from monitoring wells and seeps not sampled or analyzed as part of the Site-Wide Groundwater Monitoring Program.
- Installation of additional monitoring wells to address data gaps at the Hazardous Materials Storage Area (HMSA).
- Collection of volatile organic compound (VOC) source information at the Former Sodium Disposal Facility (FSDF).

Data collection activities reported herein were performed separately by North Wind and CDM Smith under separate contracts to DOE.

A resampling event was conducted in August 2018 to verify one or more analytes at wells RD-33A, RD-33C, RD-59A, and RD-59C. Trespassers had tampered with wells RD-33A and RD-33C and thus the wells were resampled to assess whether the tampering had introduced contamination. Nothing anomalous was discovered and thus provides a line of evidence that tampering had not affected the groundwater or quality of Q1 samples collected from these wells.

Strontium-90 (Sr-90) results from RD-59A and RD-59C from the Q1 sampling event were suspected to be anomalous and false positives and thus the wells were resampled for confirmation purposes. This annual report includes the Q1 Sr-90 analytical data and the August 2018 Sr-90 resample data for comparison purposes.

Table 1 lists the wells present within Area IV during the sampling and associated sampling program, i.e., sampled under the WQSAP or sampled to address groundwater RFI data needs.

Well, piezometer, and seep locations are shown on Figure 3. The wells that are identified as Site-Wide Monitoring Program wells are highlighted on Figure 4. Well construction details are provided in Appendix A.

North Wind completed field groundwater monitoring activities during the first, second, third, and fourth quarters of the 2018 reporting period, and CDM Smith completed monitoring well installation,

sampling, aquifer testing, seep sampling, and source investigations in May, June, and July 2018. Field activities were conducted in general accordance with the Site-Wide WQSAP (Haley & Aldrich 2010b), with exceptions described in Section 3.4. Field personnel followed the sampling and analysis requirements described in the Site-Wide WQSAP.

Former Sodium Disposal Facility Groundwater Interim Measure (GWIM)

In November 2017, DOE initiated a GWIM at the FSDF, which involved the periodic pumping of near-surface well RS-54, to remove contaminant mass for trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA) associated with near-surface bedrock fractures (about 30 feet bgs). The pumping and sampling of RS-54 continued into 2018 primarily on a monthly basis as water recovery in the well was slow. After pumping well RS-54 in June 2018, the well did not recover sufficient water for subsequent pumping. However, a corehole (C-21) drilled in June 2018 exhibited TCE concentrations greater than 1,000 micrograms per liter (µg/L), which is a requirement threshold for GWIM. Corehole C-21 was used for the subsequent groundwater extraction activity and was pumped in June, July, August, September, October, and December 2018. No pumping occurred in November due to the Woolsey Canyon wildfire. A technical memorandum (CDM Smith 2018e) provides a summary of the history of the GWIM, groundwater contaminants treated, and volume of water extracted.

Groundwater Seep Probe Sampling

The sampling of four clusters of groundwater seep probes was conducted in June 2018. One cluster is in the Northern Buffer Zone and the other three on Brandeis property north of SSFL Area IV. Tritium above background was observed in the Northern Buffer Zone cluster. No Area IV–related groundwater contamination was observed in the Brandeis clusters. The results are summarized in a technical memorandum (CDM Smith 2018b).

HMSA Well Installations

Two piezometers (PZ-162 and PZ-163) were installed into alluvium and weathered bedrock (nominally 40 feet bgs), a deeper well was installed in the center of the HMSA (DD-146), and the depth of a shallow bedrock well (RD-89) was deepened (and renamed DD-147) as part of the groundwater investigation activities at the HMSA. All wells were sampled per the WQSAP following installation and development. A technical memorandum (CDM Smith 2018f) describes the installation activities. Data tables in this Annual Report provide the analytical results for PZ-162, PZ-163, DD-146, and DD-147.

HMSA Near-Surface Groundwater Aquifer Test

As part of the corrective measures study evaluation of the near-surface impacted groundwater at the HMSA, a short-term aquifer test was performed to provide data on the volume of impacted groundwater. Piezometer PZ-62 was used as the pumping well and adjacent wells PZ-108, PZ-109, PZ-120, PZ-122, PZ-162, and DD-144 were used as observation wells. All wells with sufficient water were also sampled during the period of the aquifer test. A summary of the aquifer test findings is presented in a technical memorandum (CDM Smith 2018c).

FSDF Near-Surface Bedrock Fracture Source Investigation

As part of the evaluation of near-surface bedrock fractures harboring impacted groundwater (as is observed at well RS-54), eight 53- to 63-foot-deep borings were drilled into bedrock. During drilling, bedrock core samples were extracted for observations of fractures and chemical testing for VOCs. Following drilling, the coreholes were converted to monitoring wells. All eight coreholes (C-20, C-21,

C-22, C-23, C-24, C-25, C-26, C-27) produced sufficient water for sampling. Corehole C-21 exhibited the highest VOC concentrations and thus was used for the continuation of the FSDF GWIM. A technical memorandum (CDM Smith 2018d) provides the rock core VOC results. Data tables in this Annual Report provide the analytical results for the corehole groundwater samples.

3.1 Modifications to Well Network and Equipment

Table 1 has been updated to include the new wells installed by DOE during 2018. Eleven new wells were installed, and one well was deepened in 2018. Table 2 presents well maintenance, equipment modifications, well construction, and well development activities performed on Area IV wells during 2018. The FSDF coreholes were not developed as conventional wells because groundwater collected in the coreholes relies on seepage of water from narrow bedrock fractures. It can take several weeks for the corehole water levels to recover following water evacuation of the wells.

3.2 Water Level Gauging

Area IV static water levels were gauged at all accessible program wells. Depths to water were measured from the top of each well casing. Conditions of the well (e.g., loose caps, damaged casing) were recorded in field logs. Wells were gauged using an electronic water-level meter. Portions of the cable and meter or probe that were in contact with groundwater were decontaminated before use at each well. Water levels were obtained in first, second, third, and fourth quarters of 2018 and are summarized in Table 3. Water supply well WS-07 was not gauged. Gauging of WS-07 may be performed by NASA and/or Boeing in the future.

Water level gauging as part of the FSDF GWIM are reported in the GWIM Status Report (CDM Smith 2018e) separately from this Annual Report. Water level gauging performed during the HMSA aquifer test are also reported separately (CDM Smith 2018c).

3.3 Groundwater Sampling and Analysis

Area IV monitoring wells are scheduled to be sampled annually in accordance with the Site-Wide WQSAP. The Area IV Site-Wide Groundwater Monitoring Program includes 66 wells that are included in the Site-Wide Water Level Monitoring Program. Of those 66 wells, 30 wells are included for sampling under the Site-Wide Sampling Program. An additional 55 wells are subject to groundwater sampling under the RFI Program. A total of 47 DOE wells were scheduled to be sampled during Q1 2018. Of those, three wells (PZ-097, PZ-124, RS-18) were dry, one well (RD-30) had a pump malfunction, and one well (RD-57) has been welded shut. A total of 17 Site-wide wells and 30 RFI wells were sampled.

The locations of the wells, piezometers, and seeps are presented on Figure 3. The Site-Wide Groundwater Monitoring Program wells are presented in Table 1 and shown on Figure 4. Wells that could not be sampled in Q1 2018 and the associated reasons are discussed in Table 4. Groundwater field parameters collected during purging, prior to sample collection, are presented in Table 5. Tables 6 and 7 present the samples analyzed and analytical methods, respectively.

In May 2018 CDM Smith sampled existing piezometers PZ-108 and PZ-120, existing bedrock well DD-144, and two newly installed piezometers, PZ-162 and PZ-163, part of aquifer testing at the HMSA. Newly installed bedrock wells DD-146 and DD-147 were sampled in August 2018. Sampling was based on WQSAP provisions. Sampling activities are described and reported in a technical memorandum (CDM Smith 2018f).

In June 2018 CDM Smith sampled the eight newly drilled coreholes at the FSDF and near-surface well RS-18. RS-18 had insufficient water in February 2018 to be sampled but exhibited sufficient water in June and was sampled. Sampling was based on WQSAP provisions and results for the eight coreholes were reported in a technical memorandum (CDM Smith 2018d). For reference, the RS-18 VOC data from the June 2018 sampling are provided in Table 10 of this Annual Report.

The sampling of four seep well clusters located north of Area IV was conducted June 18 to June 27, 2018, by CDM Smith. The seep clusters are located on the slope north and down-gradient of Area IV, as shown in Figure 3. Three of the probe clusters (SP-424, SP-900, and SP-19) are located on Brandeis property and one cluster (SP-T02) is in the Northern Buffer Zone. Samples were collected from 11 of the 12 seep wells visited, with seep well SP-T02A being dry. Seep cluster wells SP424-A, SP-424-B, SP-4242C, and SP-990A had artesian conditions and were sampled from water flowing from the well head. Remaining seep wells were purged and sampled using ¼-inch polyethylene tubing using a peristaltic pump. Purge water was monitored for water quality parameters (temperature, specific conductance, pH, turbidity, and oxidation reduction potential) using a YSI sonde meter. Samples were obtained once parameters stabilized. The results for water quality parameters and specific information regarding exceptions to the WQSAP, if any, and analyses performed are provided in a technical memorandum (CDM Smith 2018b).

3.4 Deviations from Water Quality Sampling and Analysis Plans

Exceptions to the Site-Wide WQSAP (Haley & Aldrich 2010b) are presented in Table 4. Exceptions included wells that could not be sampled due to being dry; wells containing insufficient water for sampling; and a well obstruction caused by a partially removed Flexible Liner Underground Technologies (FLUTe) multi-level sampling system.

Stabilization readings for some wells were collected at intervals greater than five minutes based on giving enough time to exchange water in the flow-through cell due to the flow rate. For one well, low-flow stabilization criteria were not met based on the water level drawdown exceeding 0.3 feet.

Due to an obstruction in well RD-34B, the groundwater sample from this well was collected using a pump placed immediately above the obstruction (167 feet below ground surface), and low-flow sampling procedures were followed.

The reporting limit for vinyl chloride, 1 µg/L, was above the SSFL groundwater screening level reference value (SSFL screening criteria) maximum contaminant level (MCL) criterion of 0.5 µg/L. The method detection limit (MDL) was 0.10 µg/L, however, and all sample results were non-detect so the 1 µg/L reporting limit is considered sufficient for project purposes. The reporting limit was also elevated for 1,2-dichloroethane (1,2,-DCA) at 1 µg/L (MDL = 0.13 µg/L) whereas the MCL criterion is 0.5 µg/L. The reporting limit for carbon tetrachloride was also above the SSFL screening criterion (MCL) of 0.5 µg/L at 1 µg/L. The MDL was 0.19 µg/L, which is below the criterion. If results are detected between the MDL and reporting limit they are reported as detected estimated results. Also, there were instances where the reporting limits for these analytes were elevated due to laboratory dilutions necessary to remain within instrument calibration limits when high concentrations of other target analytes were encountered. All these sample reporting limits are considered sufficient and meet project requirements.

The reporting limit for gasoline-range organics (GRO) is above the taste/odor threshold of 5 µg/L for the SSFL screening criteria. The reporting limit from the December 2010 Site-Wide WQSAP (Haley & Aldrich 2010b) has a value of 50 µg/L. The laboratory had a reporting limit of 25 µg/L and an MDL of 10 µg/L. Any results detected between 10 µg/L and 25 µg/L have been reported as estimated

concentrations, and those above 25 µg/L have been reported as detections. The reporting limit and MDL values are both below the WQSAP stated reporting limit. Based on professional judgment the 25 µg/L reporting limit is adequate for project purposes.

No exceptions other than those listed in Table 4 occurred for Area IV wells during 2018.

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4. MONITORING RESULTS

This section provides a review of Area IV 2018 groundwater levels, and groundwater quality results and trends. Historical data were summarized in previous reports by:

- Groundwater Resources Consultants (GWRC 2000);
- Haley & Aldrich (2001 through 2010a);
- MWH (2011a, 2011b, 2012, 2013, 2014);
- CDM Smith (2015b, 2016a, 2016b, 2016c); and
- North Wind (2017, 2018, 2019).

Groundwater screening reference values used to evaluate results are presented in Table 8. First-time detections of analytes and new historical maximum results are presented in Table 9.

4.1 Groundwater Elevations and Flow Conditions

Water level elevations for 2018 are presented in Table 3. Annual precipitation data are presented in Appendix B. Water level hydrographs are provided in Appendix C. Occurrence and movement of groundwater at Area IV are influenced by precipitation and pumping.

Groundwater elevations measured in SSFL Chatsworth Formation monitoring wells during Q4 2018 ranged from a low of approximately 1,312 feet above mean sea level (MSL) at well RD-59A to a high of about 1,789 feet above MSL at well DS-43 (Table 3, Figure 5). The perched zone elevations ranged from a low of 1,784 feet above MSL at PZ-108 to a high of 1,805 feet above MSL at RS-54. The GWIM groundwater extraction events at and near RS-54 did not significantly influence the groundwater elevation contours in the FSDF area (Figure 5).

In addition to the quarterly groundwater elevation monitoring per the WQSAP, groundwater elevation monitoring was performed as part of the FSDF GWIM and for the HMSA aquifer testing (CDM Smith 2018c,e). Groundwater elevation monitoring of the FSDF pumping wells (RS-54 and C-21) occurred on at least a weekly basis. Groundwater elevation monitoring occurred prior to, during, and following the HMSA aquifer test. Groundwater pumping occurred at the FSDF as part of dewatering near-surface fractures and at the HMSA as part of the aquifer test. Groundwater pumping of RS-54 has resulted in the reduced water level over time of over 15 feet in this well only. Bedrock groundwater at the FSDF is 200 feet below the fractures that were pumped with no indication of bedrock groundwater level change. Water level elevation recovery tracking for the HMSA wells indicated no water level impact for that area.

Figure 5 presents contours of first-encountered, non-perched groundwater elevations, as determined from water levels measured during Q1 of 2018. Additional information that helped constrain the contouring included topography, the approximate elevations of identified seeps, historical water level data for wells and piezometers not gauged during 2018, and the understanding that groundwater level discontinuities coincide with certain fault segments and other geologic structures. In the case of well clusters, water levels from the shallowest wells were used. The data represent water levels primarily within the Chatsworth Formation, but include levels in younger deposits where the zone of saturation is continuous with the underlying formations.

The groundwater elevation contour map is provided to satisfy, in part, the requirements of Title 22 California Code of Regulations (22 CCR), Section 66264.97, for determining groundwater flow rates and directions. A groundwater elevation contour map can be used in simple hydrogeologic settings to depict variations in the elevation of the water table surface, which can in turn be used to interpret apparent relative directions of groundwater flow. However, the groundwater elevation contours depicted in Figure 5 are not used to infer groundwater flow directions or rates of groundwater movement due to the hydrogeologic complexities at SSFL as described in Section 2.2. Mountain-scale estimates of groundwater flow rates and three-dimensional groundwater flow directions from areas within SSFL were made and are presented in the draft groundwater remedial investigation (RI) report (MWH 2009). While DOE acknowledges the significant effort that has been spent calibrating the mountain-scale model, DOE believes that the model does not characterize the flow paths in Area IV with sufficient accuracy to make important investigation and remediation decisions. As part of the RFI Program, local-scale flow and transport modeling was performed for DOE by Dr. Scott James of Baylor University and Dr. Bill Arnold to reflect Area IV groundwater conditions. The results of the model revisions are reported in the Draft RCRA Facility Groundwater RI Report (CDM Smith 2018a).

4.2 Groundwater Quality

Laboratory analytical results for groundwater samples are tabulated in Tables 10 through 15. Constituents detected for the first time in groundwater sampled from individual locations are presented in Table 9. Constituents previously detected in groundwater sampled from a particular location and reported at new maximum concentrations are also presented in Table 9. Aside from these exceptions, the analytical results were within historical ranges (GWRC 2000; Haley & Aldrich 2001 through 2010a; MWH 2003, 2011a, 2011b, 2012, 2013, 2014) and 2014, 2015, 2016, and 2017 Annual Reports (CDM Smith 2015b, 2016d; North Wind 2017, 2018). Time series plots of analytical data for select wells and analytes are provided in Appendix D.

Groundwater chemical concentration data from the 2018 reporting period are presented on chemical extent maps illustrating areas of impacted groundwater for 13 chemicals on Figures 6 through 18. These chemicals were selected for mapping because they are COCs in the Site-Wide Groundwater Monitoring Program, and were selected for presentation on chemical extent maps in the Groundwater RI Report (MWH 2009).

4.2.1 Quality Assurance and Quality Control

Completeness goals regarding the 2018 data quality were met and the data are suitable for the intended uses (Appendix E).

Per the Site-Wide WQSAP (Haley & Aldrich 2010b), the quality assurance assessment provides an assessment of data quality, including precision, accuracy, representativeness, comparability, completeness, and sensitivity. The quality assurance assessment also includes results of the data validation process, and a summary of the field sampling and analytical program, data management review procedure, and data verification process.

4.2.2 Groundwater Screening Reference Values

The groundwater sampling results for individual chemicals are compared for discussion purposes to the following screening values, listed in approximate descending order of importance and/or relevance:

- Site-specific values developed by DTSC (i.e., groundwater comparison concentrations for metals) (listed as SSFL Comparison in report tables);

- Isotope-specific activity limits for individual beta/photon emitters based on the effective dose equivalent of 4 millirems per year (mrem/yr) (Federal Register 2000);
- Primary MCLs established by the EPA and promulgated by the Safe Drinking Water Act, and by the California Department of Public Health (DPH) promulgated by 22 CCR, sections 64431 through 64449 and 64672 (Regional Water Quality Control Board [RWQCB] 2008; DPH 2008) (listed as Primary MCL and Cal MCL in report tables);
- Notification Levels/Advisory Levels established by the California DPH (RWQCB 2008; DPH 2010);
- Secondary maximum contaminant levels (SMCLs), which address aesthetics such as taste and odor (RWQCB 2008; DPH 2006) (listed as Secondary MCL in report tables);
- Taste and Odor Threshold (RWQCB 2008) (listed as Taste/Odor in report tables); and
- Site-specific values developed for SSFL using risk assessment procedures assuming direct ingestion of groundwater (listed as site-wide groundwater risk-based screening level [SWGW RBSL] in report tables).

For chemicals with more than one screening value, the lower value is used to be more conservative. When EPA and California DPH values for MCLs differ, the lower value is used. In cases where the secondary maximum contaminant level (SMCL) is lower than the primary MCL, the SMCL is used.

The methodology used to develop the risk-based screening values for chemicals that are not metallic elements and where there are no agency-published values is described in a technical memorandum included in Appendix 7-C of the Groundwater RI Report (MWH 2009). Groundwater screening reference values are presented in Table 8.

4.2.3 Areas of Impacted Groundwater

Chemical concentration data from the 2018 reporting period are posted on chemical extent maps showing areas of impacted groundwater for 13 chemicals on Figures 6 through 18. For wells not sampled in 2018, the figures present the most recent sample results. The 13 chemicals were selected for mapping because they are COCs in the Site-Wide Groundwater Monitoring Program, generally exhibit more than solitary spatially isolated detects, were presented on chemical extent maps in the Groundwater RI Report (MWH 2009) and the RFI Work Plan (CDM Smith 2015a), and were based on a comprehensive site-wide evaluation of their extent in groundwater.

The COC figures presented in this report reflect data for TCE, tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride, 1,1-dichloroethene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), 1,1-dichloroethane (1,1-DCA), 1,4-dioxane, carbon tetrachloride, total petroleum hydrocarbons (TPH), nitrate, and tritium. Perchlorate is a COC but current conditions indicate that no areas of impacted groundwater are identified. No figure is presented for this analyte. Analytes 1,2,3-trichloropropene (1,2,3-TCP), formaldehyde, n-nitrosodimethylamine (NDMA), and fluoride are discussed in this section because they were analytes identified as needing further evaluation.

Chemicals with concentrations historically exceeding screening values at five or more locations but having adequate sampling coverage in recent data to indicate the chemical is no longer present at concentrations above the SSFL screening criteria (e.g., 1,1,1-TCA, chloroform, and benzene) were not included. Chemicals that are common laboratory contaminants (e.g., methylene chloride and bis [2-ethylhexyl] phthalate) and those that are naturally occurring and for which there is no known site-

related anthropogenic source (e.g., sulfate) were also not included, even if they had concentrations exceeding screening values at five or more locations.

The 2018 analytical results were evaluated to identify any additional chemicals for which a chemical extent map was warranted according to the criteria used in the Groundwater RI Report (MWH 2009). No additional chemicals were identified for generation of a chemical extent map.

Areas of impacted groundwater from the Groundwater RFI Report (CDM Smith 2018a) form the basis of those shown in the chemical extent maps in this report. Adjustments to the areas of impacted groundwater are made each year, as new data are collected. The chemical extent boundaries for each chemical are defined by the groundwater screening reference values listed in Table 8. The maximum concentrations at each location from samples collected in 2018 are posted for each chemical and the locations are color-coded to indicate whether the result exceeded the screening value, was detected below the screening value, or was not detected. For locations that were not sampled in 2018, the most recent historical result is posted along with the date the sample was collected.

Isoconcentration lines equal to screening values for selected chemicals in groundwater are depicted in Figures 6 through 18 and are based on both current and historical sampling results as well as professional judgment, particularly for chemicals that are transformation or daughter products from either the biological or abiotic decay of a parent (e.g., cis-1,2-DCE produced from the biological transformation of TCE). The screening-value isoconcentration lines represent the interpreted map-view extent of impacted groundwater based on all available data, not just the most recent reporting period.

The areas of impacted groundwater for each of the chemicals plotted are discussed below and have been adjusted based on the results from the first quarter 2018 sampling event.

Trichloroethene (Figure 6 and Table 10)

For TCE there are five impacted areas in Area IV.

FSDF Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2018 include wells:

- RD-23 at 1,100 µg/L
- C-8 at 82 µg/L
- RD-21 at 45J µg/L
- RD-65 at 10 µg/L.

The TCE concentration detected in RD-23 is a new maximum (Table 9), increasing orders of magnitude from 34 µg/L detected in 2017. The TCE detection in corehole C-8 was also a new maximum at 82 µg/L (Table 9), increasing from 2.5 µg/L detected in 2017. The 2018 result at RD-21 increased from 27 µg/L in 2017. The RD-65 detection decreased from 47 µg/L detected during 2017. TCE in RD-33A remained below the MCL in 2018 from 7 µg/L detected during the first quarter 2016. Well RD-64 was dry during 2018 and had a detection of 25 µg/L during 2017.

Building 4100 / Building 56 Landfill Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2018 includes well:

- RD-07 at 32 µg/L.

The 2018 TCE concentration at RD-07 was similar in concentration to the result detected in 2017 (29 µg/L).

Metals Clarifier / DOE Leach Field 3 Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2018 includes well:

- PZ-105 at 11 µg/L.

The 2018 detection at PZ-105 was similar in concentration to the result detected in 2017 (7.9 µg/L).

HMSA Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2018 include wells:

- DD-144 at 200 µg/L
- PZ-108 at 160 µg/L
- PZ-120 at 5.6 µg/L.

The concentrations detected at DD-144 and PZ-108 are similar to those detected during 2017 (170 and 160 µg/L, respectively). The concentration at DD-144 is a new maximum (Table 9). PZ-120 decreased from 13 µg/L in 2017.

Radioactive Materials Handling Facility (RMHF) Area

TCE concentrations detected above the MCL of 5 µg/L for this area in 2018 include well:

- RD-63 at 6 µg/L.

The TCE detection in RD-63 is similar to the result detected in 2017 (6.2 µg/L).

Tetrachloroethene (Figure 7 and Table 10)

There is one area impacted by PCE in Area IV.

Buildings 4057/4059/4626 Area

- PCE was detected above the SSFL screening criterion (MCL) of 5 µg/L in well PZ-109 at a concentration of 72 µg/L. This concentration increased from the result detected in 2017 (42 µg/L).
- PCE was also detected just below the MCL in well DD-142 at a concentration of 3.6 µg/L, which is similar to the result detected in 2017. With the exception of a low estimated detection at DS-43, all other wells in this area were nondetect for PCE.

cis-1,2-Dichloroethene (Figure 8 and Table 10)

There are four areas impacted by cis-1,2-DCE.

FSDF Area

- For this area, cis-1,2-DCE was detected above the SSFL screening criterion (MCL) of 6 µg/L in wells RD-65 and RD-23 at a concentration of 9.7 µg/L and an estimated concentration of 28J µg/L, respectively. The detection at RD-23 increased from below the MCL in 2017.

- The compound cis-1,2-DCE was detected below the MCL in wells RD-21, RD-33A, RD-54A, and C-8. The 4.8 µg/L detection at C-8 is a new maximum (Table 9).

Building 56 Landfill Area

- Well RD-07 had a maximum detected value for cis-1,2-DCE of 2.2 µg/L, which is below the SSFL screening criterion (MCL) and at a concentration similar to that detected in 2017.
- Well DD-141 was nondetect for cis-1,2-DCE. No other wells in this area were sampled, as all previous results were nondetect.

Building 4457 HMSA Area

- For this area, cis-1,2-DCE was detected above the SSFL screening criterion (MCL) of 6 µg/L in well DD-144 at a concentration of 16 µg/L, which is similar to the 2017 detection.
- The compound cis-1,2-DCE was also detected above the MCL in PZ-108 at a concentration of 12 µg/L, which is similar to the 2017 detection.
- The compound cis-1,2-DCE was also detected below the MCL in PZ-109 at an estimated concentration of 1.9J µg/L.
- The remaining wells in this area were nondetect for cis-1,2-DCE.

RMHF Area

- Well RD-63 had detected concentration of cis-1,2-DCE below the SSFL screening criterion (MCL) of 6 µg/L at concentration of 4.3 µg/L.

trans-1,2-Dichloroethene (Figure 9 and Table 10)

There is one area impacted by trans-1,2-DCE.

FSDF Area

- During 2018, trans-1,2-DCE was detected in RD-65 at 24 µg/L, above the SSFL screening criterion (MCL) value of 10 µg/L. This is a new maximum (Table 9) and the second year in a row that trans-1,2-DCE was detected above the MCL. A new maximum of trans-1,2-DCE was also detected in RD-33A at 3.2 µg/L.

The remaining FSDF wells sampled during 2018 were all nondetect for trans-1,2-DCE.

Other Results

The other wells that were sampled in 2018 all had nondetect concentrations for trans-1,2-DCE.

Vinyl Chloride (Figure 10 and Table 10)

There is one area impacted by vinyl chloride.

FSDF Area

- Vinyl chloride results were nondetect for all wells sampled in 2018. In general, the reporting limit for vinyl chloride was 1 µg/L, which was above the SSFL screening criterion (MCL) of 0.5 µg/L. However, the MDL was 0.10 µg/L; with all sample results being nondetect, the 1 µg/L reporting

limit is considered sufficient for project purposes. The vinyl chloride reporting limit and MDL at well RD-23 were elevated above the MCL to 40 µg/L and 4 µg/L, respectively, due to a 40 times laboratory dilution factor. For reference, the detected TCE concentration at RD-23 was 1,100 µg/L.

Other Results

- The vinyl chloride reporting limit and MDL at HMSA well PZ-108 were elevated above the MCL to 10 µg/L and 1 µg/L, respectively, due to a 10 times laboratory dilution factor. For reference, the detected TCE concentration at PZ-108 was 160 µg/L.

1,1-Dichloroethene (Figure 11 and Table 10)

There are two areas impacted by 1,1-DCE.

FSDF Area

- During 2018, 1,1-DCE was detected above the SSFL screening criterion (MCL) of 6 µg/L in RD-23 at an estimated concentration of 30J µg/L, which is an increase from an estimated detection of 0.6J µg/L during 2017. It is notable that the laboratory applied a 40 times dilution to the 2018 sample due to the elevated TCE concentration (1,100 µg/L). This is a new maximum detection (Table 9).
- 1,1-DCE was detected above the MCL in RD-65 at a concentration of 7.7 µg/L, which is similar to the 2017 result.
- RD-33A had an estimated 1,1-DCE detection of 0.54J µg/L. All the other wells sampled in this area had nondetect results or estimated results an order of magnitude below the MCL.

RMHF Area

- In the RMHF area, well RD-63 had an estimated detected concentration for 1,1-DCE of 0.77J µg/L, which is below the SSFL screening criterion (MCL). All the other wells sampled in this area had nondetect results.

1,2-Dichloroethane (Figure 12 and Table 10)

There is one area impacted by 1,2-DCA.

FSDF Area

- During 2018, there were no detections of 1,2-DCA in the FSDF Area. However, the reporting limit and MDL at well RD-23 were elevated above the MCL (0.5 µg/L) to 40 µg/L and 5.2 µg/L, respectively, due to a 40 times laboratory dilution factor. For reference, the detected TCE concentration at RD-23 was 1,100 µg/L. Similarly, the reporting limit and MDL were elevated at corehole C-8 due to a 4 times laboratory dilution.

Other Results

- The 1,2-DCA reporting limit and MDL at HMSA well PZ-108 were elevated above the MCL to 10 µg/L and 1.3 µg/L, respectively, due to a 10 times laboratory dilution factor. For reference, the detected TCE concentration at PZ-108 was 160 µg/L. Similarly, the reporting limit and MDL were elevated at DD-144 and PZ-109 due to a 4 times laboratory dilution.

- For the remaining wells sampled for 1,2-DCA, sample results were nondetect. The reporting limit, though, was above the SSFL screening criterion (MCL) of 0.5 µg/L at 1 µg/L. However, the MDL was 0.13 µg/L; with all results being nondetect, the 1 µg/L reporting limit is considered sufficient for project purposes.

1,1-Dichloroethane (Figure 13 and Table 10)

There is one impacted by 1,1-DCA.

FSDF Area

- 1,1-DCA was detected in well RD-65 at a concentration of 2.3 µg/L, which is below the MCL of 5 µg/L. The 2016 and 2017 concentrations were also below the MCL.
- Well RD-33A had an estimated detection an order of magnitude below the MCL at 0.41J µg/L.
- The reporting limit and MDL at well RD-23 were elevated above the MCL to 40 µg/L and 8.8 µg/L, respectively, due to a 40 times laboratory dilution factor. For reference, the detected TCE concentration at RD-23 was 1,100 µg/L.

Other Results

The other wells that were sampled in 2018 all had nondetect concentrations except RD-63 in the RMHF area with an estimated concentration of 0.61J µg/L. This result is below the MCL.

1,4-Dioxane (Figure 14 and Table 10)

There are two areas historically impacted by 1,4-dioxane.

FSDF Area

- 1,4-dioxane was detected above the SSFL screening criterion (notification level) of 1 µg/L in DS-46 at a concentration of 1.5 µg/L. This concentration is similar to the prior detection when it was last analyzed in 2016 and is a new maximum (Table 9).
- 1,4-dioxane was detected below the MCL in wells RD-65 and DD-140 at 0.5J µg/L and 0.9J µg/L (estimated), respectively. In 2013, RD-65 had a concentration above the screening level at 2.1 µg/L and was not sampled for 1,4-dioxane in 2015, 2016, or 2017. In 2016, DD-140 was detected above the screening level at an estimated concentration of 1.4J µg/L.
- The detection at RD-34B of 0.48J µg/L is a first-time detect and new maximum (Table 9)

RMHF Area

- 1,4-dioxane was not analyzed in RD-63 during 2017 and 2018. However, it was analyzed during 2016 and detected above the SSFL screening criterion (notification level) of 1 µg/L in RD-63 at 1.4 µg/L. It is recommended that 1,4-dioxane analysis be added for RD-63 for future sampling rounds.

Carbon Tetrachloride (Figure 15 and Table 10)

There is one area impacted by carbon tetrachloride.

FSDF Area

- Carbon tetrachloride was detected in well RD-21 at a concentration of 11 µg/L, which is above the SSFL screening criterion (MCL) of 0.5 µg/L. This is similar to the concentration detected in 2017.

Other Results

- The other wells that were sampled all had nondetect concentrations for carbon tetrachloride. The reporting limit for carbon tetrachloride was 1 µg/L, above the SSFL screening criterion (MCL) of 0.5 µg/L; however, the MDL was below the MCL at 0.19 µg/L, which is considered sufficient for project purposes.
- The carbon tetrachloride reporting limit and MDL at wells C-8, PZ-108, PZ-109, RD-23, and DD-144 were elevated above the MCL due to 10 to 40 times laboratory dilution factors.

Total Petroleum Hydrocarbons C4-C30 (Figure 16 and Table 12)

There are three areas impacted by TPH, which are defined by two categories: diesel-range organics (DRO; C10-C28); and GRO (C6-C10). For the purposes of plume delineation the contour areas are combined.

The SSFL screening criterion for DRO is 100 µg/L and for GRO it is 5 µg/L. There were discrepancies in these criteria between Table 8 and the required reporting limit presented in the WQSAP. Both Table 8 and the reporting limits presented in the WQSAP are very low, and laboratories have shown it is hard to achieve these limits. For evaluation in this document the limits used are as stated, and evaluation of nondetect results in cases where the values are greater than the SSFL screening criteria is performed on a case-by-case basis.

FSDF Area

- Well RD-54A was sampled for GRO and DRO for the first time during 2018 with GRO detected above the screening criterion at 57J µg/L (estimated) and DRO at 58J µg/L (estimated). These are first-time and new maximum detections (Table 9).
- GRO and DRO were not analyzed at well C-8 during 2018. During 2016, DRO was above the 100 µg/L SSFL screening criterion (threshold criteria) at an estimated concentration of 140J µg/L. DRO analysis is recommended for future sampling at this well.

Metals Clarifier / DOE Leach Field 3 Area

- DRO were detected in PZ-105 above the 100 µg/L SSFL screening criterion at a concentration of 520 µg/L. This increased from 180 µg/L during 2017 and is a new maximum detect (Table 9). DRO were also detected in DD-145 below the screening criterion at an estimated concentration of 56J µg/L.
- GRO were detected in PZ-105 above the screening criterion at an estimated concentration of 11J µg/L. This is a first-time and new maximum detect (Table 9).

RMHF Area

- DRO were detected below the screening criterion in RD-34A and RD-63 at estimated concentrations of 55J µg/L and 46J µg/L, respectively. RD-63 is a first-time and new maximum detection (Table 9).
- Well PZ-121 in the RMHF area had nondetect concentrations when last sampled in 2008. The reporting limits, though, were above the SSFL screening criteria (threshold criteria) for both DRO and GRO. This well was dry and not sampled in 2018. It will continue to be monitored in 2019.

Building 56 Landfill Area

- GRO were detected in DD-141 above the screening criterion at an estimated concentration of 55J µg/L. This is a first-time and new maximum detect (Table 9).
- DRO were detected in RD-96 below the screening criterion at an estimated concentration of 51J µg/L. This is a new maximum detect (Table 9).

Old Conservation Yard

- DRO were detected in RD-14 below the screening criterion at an estimated concentration of 43J µg/L. This is a first-time and new maximum detect (Table 9).

Nitrate as NO_3 (Figure 17 and Table 13)

There is one area of impacted groundwater for nitrate.

Metals Clarifier / DOE Leach Field 3

- Nitrate was detected below the MCL of 45 milligrams per liter (mg/L) at DD-145 and PZ-105 at concentrations of 4.2 mg/L and 4.4 mg/L, respectively. The detections are new maximums (Table 9).

Other Results

Nitrate was detected in Building 4100 Trench area well RD-20 below the MCL at 9.4 mg/L.

Tritium (Figure 18 and Table 14)

There is one area of impact for tritium.

Tritium Plume Area

- The concentrations of tritium were above the SSFL screening criterion (MCL) of 20,000 picocuries per liter (pCi/L) for well RD-90 at 31,600 pCi/L, and for RD-95 at 31,000 pCi/L. The concentration at RD-90 is similar to the 2017 detection, whereas RD-95 increased from 19,600 pCi/L detected in 2017.

Other Results

All other wells and seeps sampled in Area IV had tritium results that were nondetect.

Other Analytes of Interest

The following analytes are not considered COCs but are of potential interest.

Perchlorate (Table 11)

In the past there was one area of impacted groundwater for perchlorate. Current conditions indicate that there are no areas of impacted groundwater from perchlorate since all 2018 sample results are below the SSFL screening criterion (MCL) of 6 µg/L. Sample results for 2018 are discussed below for the former area of impacted groundwater.

FSDF Area

- The highest 2018 perchlorate result was estimated at 2.3J µg/L at RD-21.
- All other perchlorate results were very low or nondetect. The estimated detection at RD-33B of 0.017J µg/L is a first-time and new maximum detection (Table 9).

No figure is required for this analyte.

1,2,3-Trichloropropane (Table 10)

There are no areas in Area IV with 1,2,3-TCP impacted groundwater. No figure is required for this analyte.

Formaldehyde

Areas of impacted groundwater for formaldehyde are not present in Area IV. No figure is required for this analyte.

N-Nitrosodimethylamine

There are no areas of impacted groundwater for NDMA located in Area IV. No figure is required for this analyte.

Fluoride (Table 13)

The previous area of impact for fluoride was in the vicinity and south of the Systems Nuclear Auxiliary Power Facility. Since fluoride was not detected above the screening value for any Area IV wells in 2014, this area of impact was removed at that time.

4.2.4 Analytical Results

During the 2018 sampling period, analytes in groundwater samples collected in Area IV that were detected for the first time at a particular well, and/or were analyzed for the first time, are shown in Table 9. Table 9 also shows whether the 2018 detected result is a new maximum value for that analyte at that well. The following items depict the process of identifying the analytes shown in Table 9:

- Analytes that were detected for the first time in a well in 2018.
- Analytes that were analyzed for the first time ever for that well (with an asterisk).
- Of these analytes, the detected values are compared to all data to see if the 2018 value is the new maximum value for that well.

The few cases for which there are insufficient historical data to provide further context for the recent results, or that otherwise warrant further discussion, are presented below, with on-site detections (excluding radiochemical constituents) discussed in Section 4.2.4.1.

4.2.4.1 On-Site Detections

Constituent concentrations (except for radiochemical constituents that are discussed separately in Section 4.2.5) detected in groundwater samples collected from on-site wells in 2018 and presented in Table 9 are discussed below.

First-Time Analyses of an Analyte at a Particular Well

There were no new analytical suites included in the 2018 sampling event.

First-Time Detection of the Analyte and New Maximum Value

As shown in Table 9, certain analytes were detected for the first time during 2018 in various wells and those concentrations are also now the new maximum values for those analytes at these particular wells. New maximum concentrations in this category above the associated SSFL screening criteria values include:

- GRO in wells DD-141, PZ-105, and RD-54A; and
- DRO in wells DD-54A and RD-63.

Not a First-Time Detect but Analyte Concentration is New Maximum Value

As shown in Table 9, certain analytes were detected as new maximum values in various wells during 2018. Each detected concentration was not the first time each analyte was seen in the well but the value is now a new maximum concentration. New maximum values for previously detected analytes exceeding the associated SSFL screening criteria values include:

- 1,1-DCE in well RD-23;
- 1,4-dioxane in well DS-46;
- DRO in wells PZ-105, RD-14, and RD-96;
- Trans-1,2-dichloroethene in well RD-65; and
- Trichloroethylene in wells C-8, DD-144, and RD-23.

4.2.4.2 Off-Site Detections

Off-site wells sampled during 2018 included RD-59A, RD-59B, and RD-59C. New maximum detections of dissolved boron, total iron, total manganese, molybdenum, and strontium were detected in these wells during the Q1 sampling event at values orders of magnitude below screening levels. A new maximum of acetone was also detected orders of magnitude below the SSFL screening criterion in well RD-59A, and acetone was detected for the first time in well RD-59C. Since acetone interference is commonly introduced to samples from its use in laboratories, these detections may not be representative of environmental contamination.

4.2.5 Radiochemistry Results

Radiochemistry analyses were performed for samples collected during the 2018 reporting period under the Site-Wide and RFI programs, and results are presented in Table 14 and discussed further below.. Radiochemistry analyses included both total (non-filtered water) and dissolved (filtered water) results.

Due to the potential for false positive results in the Q1 data, wells RD-59A and RD-59C were resampled on 20 August for Sr-90 (total and dissolved).

Radiochemistry analytes reported for the first time in groundwater at individual locations, as well as any new maximum concentrations, are presented in Table 9.

First-Time Analyses of an Analyte at a Particular Well

There were no new analytical suites included in the 2018 sampling event.

First-Time Detection of the Analyte as well as the New Maximum Value

As shown in Table 9, certain analytes were reported for the first time in various wells and those concentrations are also now the new maximum values for those analytes at these particular wells. All radionuclides detected for the first time in various wells were below the SSFL screening criteria.

Not a First-Time Detect but Analyte Concentration is New Maximum Value

As shown in Table 9, certain analytes were reported as new maximum values in various wells in 2018. Each reported concentration was not the first time each analyte was seen in the well but the value is now a new maximum concentration. New maximum values for previously detected analytes exceeding the associated SSFL screening criteria values include:

- Total gross alpha in wells DD-141 and RD-63; and
- Strontium-90 in well RD-98.

4.2.5.1 Off-Site Detections

Off-site wells sampled during 2018 included RD-59A, RD-59B, and RD-59C. Dissolved cobalt-60 and total uranium-233/234 were detected for the first time at concentrations orders of magnitude below the screening levels. New maximums were detected below the SSFL screening criteria for gross alpha in well RD-59C, dissolved uranium-233/234 in well RD-59A, and total uranium-238 in well RD-59A.

Due to the short radioactive half-lives of isotopes including cobalt-60, it is unlikely that they would be detected in these wells for the first time during 2018 considering that the source was shut down decades ago. Thus, some of these detections may be anomalous and will continue to be compared to future sample data to determine a trend, if any exists.

Sr-90 Resample Results

Analytical results of Q1 groundwater samples showed concentrations of Sr-90 in the dissolved fraction of samples collected from offsite wells RD-59A and RD-59C. No detection of Sr-90 was reported in the total fraction of these samples, and Sr-90 has not previously been detected in these wells. The detection of Sr-90 in dissolved results but not total results indicates that the dissolved results may be false positives. The project laboratory was contacted to investigate if the results were potentially false

positives due to laboratory error. After reevaluating the results, it was determined that there was no laboratory error; however, it was noted that the detections of dissolved Sr-90 were extremely low. The level of dissolved Sr-90 detected in RD-59A was 0.363 pCi/L and the minimum detectable concentration (MDC) was 0.320 pCi/L. The Sr-90 concentration in the dissolved fraction of the sample from RD-59C was 0.464 pCi/L and the MDC was 0.260 pCi/L. In comparison, the State of California MCL in drinking water for Sr-90 is 8.0 pCi/L . Concentrations this low are at the statistical boundary of the 95% confidence interval. Further evaluation of the results at the 99% confidence interval showed that the detections could be statistically non-detect and false positives.

On 20 August 2018, wells RD-59A and RD-59C were resampled for Sr-90 (total and dissolved) to verify that these detections were in fact false positives. Split samples were also sent to General Engineering Laboratories in Charleston, SC. The samples from Test America went through a Level IV validation and the results from both laboratories were non-detect for Sr-90 (total and dissolved). The resample results from two independent laboratories indicating non-detect Sr-90 (total and dissolved) for wells RD-59A and RD-59C provide a conclusive line of evidence that these Q1 Sr-90 results were anomalous and false positives.

4.2.6 2017 Results Follow-up

This section evaluates whether or not sampling and analyses performed during 2018 are sufficient to resolve documented follow-up sampling issues from the previous annual report (North Wind 2018), and assesses the need for changes to the groundwater monitoring programs.

4.2.6.1 2017 Outstanding Issues

A number of new maximum detections of cobalt-60 and sodium-22, radionuclides with short radioactive half-lives, were listed as detected during 2017. The source for these COCs was shut down decades ago. Based on comparison with 2018 sample data, total/dissolved sodium-22 were not detected again in wells where they were detected during 2017. This resolves the issues from the previous annual report and no additional change is necessary.

Vinyl chloride, carbon tetrachloride, 1,2-DCA, 1,4-dioxane, and GRO had 2017 reporting limits above the respective SSFL screening criteria in one or more samples. Similar reporting limits were used during Q1 2018 since the results are considered sufficient and meet the project requirements, as discussed in Section 3.4 and Table 4. The reporting limit of 1.0 µg/L was met for 1,4-dioxane during Q1 2018.

Silica gel cleanup was recommended to address uncertainty whether DRO detected in groundwater samples is from released petroleum or natural/biogenic sources. Silica gel cleanup was not used to prepare Q1 2018 DRO samples. It is recommended to prepare DRO samples using silica gel cleanup for one or more future sampling rounds.

The FSDF area of impacted groundwater was reduced in 2014 due to concentrations below the SSFL screening criterion (notification level) of 1 µg/L for 1,4-dioxane in monitoring well RD-65 (0.46J µg/L). In 2013, RD-65 reported a concentration of 2.1 µg/L. Well RD-65 was not sampled for 1,4-dioxane in 2015, 2016, or 2017. RD-65 was sampled for 1,4-dioxane during Q1 2018 and was reported at an estimated concentration of 0.5J µg/L. This resolves the issues from the previous annual report and no additional change is necessary.

In 2016, 1,4-dioxane was detected above the SSFL screening criterion (notification level) of 1 µg/L in RD-33A at 1.8 µg/L, in DS-46 at 1.2 µg/L, and in DD-140 at 1.4J µg/L. These wells were not analyzed

for 1,4-dioxane during 2017 and it was recommended to add 1,4-dioxane to the analyte list for future sampling rounds at these wells. During 2018, 1,4-dioxane was analyzed from these wells and detected in DS-46 at 1.5 µg/L and in DD-140 at 0.9J µg/L. During August 2018, 1,4-dioxane was analyzed as part of the well resample and detected in well RD-33A at a concentration of 2.4 µg/L (North Wind 2019). This resolves the issue from the previous annual report and it is recommended to continue analyzing for 1,4-dioxane at these wells.

In 2017, 1,4-dioxane was not analyzed in RD-63. However, it was analyzed during 2016 and detected above the SSFL screening criterion (notification level) of 1 µg/L in RD-63 at 1.4 µg/L. It is recommended that 1,4-dioxane analysis be added for RD-63 for future sampling rounds.

During 2014, RD-23 had a DRO concentration of 17 mg/L, above the SSFL screening criterion (threshold criterion) for DRO. DRO was not sampled in well RD-23 during 2016, 2017, or Q1 2018. DRO analysis is recommended for one or more future sampling rounds at this well.

Wells RD-54A and RD-54B have never been sampled for GRO or DRO. It was previously recommended that RD54A be sampled for GRO/DRO, which was completed during Q1 2018. The DRO result was estimated at 58J µg/L and the GRO result was estimated at 57J µg/L. This resolves the issues from the previous annual report and no additional change is necessary.

The estimated concentration of nitrate was 39J mg/L for well RD-20 in 2014. This well was not sampled for nitrate in 2015, 2016, or 2017. It was previously recommended that RD-20 be sampled for nitrate, which was analyzed for during Q1 2018 with a result of 9.4 mg/L. This resolves the issues from the previous annual report and no additional change is necessary.

4.2.6.2 2017 On-site Detects

For on-site reported sample results included in the 2017 annual report, Section 4.2.4 (North Wind 2017), all analytes were analyzed accordingly unless the well had insufficient sample volume or was dry.

4.2.6.3 2017 Off-site Detects

There were no off-site results highlighted in the 2017 annual report, Section 4.2.4 (North Wind 2017) requiring follow-up in Area IV.

4.2.6.4 2017 Radiochemistry Results

For radiochemistry detected sample results reported in the 2017 annual report, Section 4.2.4 (North Wind 2017), all required methods were analyzed accordingly unless the well had insufficient sample volume or was dry.

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5. 2019 PLANNED ACTIVITIES

The monitoring frequency for the Site-Wide Program will be quarterly for water level monitoring and annually for sampling and analysis, with sampling to be performed in the first calendar quarter of 2019.

5.1 Outstanding Issues and/or Follow-Up Work

After review of the 2018 sampling, some outstanding issues were identified and recommendations have been made for potential follow-up work. These are listed below based on rationale provided in Section 4.2.6.1.

- It is recommended to prepare DRO samples using silica gel cleanup for one or more future sampling rounds.
- Continue sampling of the following for future sampling rounds:
  - 1,4-dioxane from DD-140, DS-46, and RD-33A;
  - DRO from RD-23, RD-33A, and RD-33C; and
  - GRO from DD-141.
- Add sampling of the following for future sampling rounds:
  - 1,4-dioxane from RD-63, and RS-54; and
  - DRO from C-8.

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TABLES

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TABLE 1
LIST OF DOE WELLS – SITE-WIDE GROUNDWATER MONITORING PROGRAM
DOE AREA IV GROUNDWATER RFI
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
C-08	RFI			FSDF B4886
PZ-005	RFI			MC/DOE LF3
PZ-041	RFI			HMSA
PZ-097	S	17	W	FSDF B4886
PZ-098	RFI			FSDF B4886
PZ-100	RFI			FSDF B4886
PZ-103	RFI			MC/DOE LF3
PZ-104	RFI			MC/DOE LF3
PZ-105	RFI			MC/DOE LF3
PZ-108	S	15	W	B4457 HMSA
PZ-109	RFI			B4057/4059/4626
PZ-116	RFI			RMHF
PZ-120	RFI			B4457 HMSA
PZ-121	RFI			B4457 HMSA
PZ-122	RFI			B4457 HMSA
PZ-124	S	16	W	B56 Landfill
PZ-162	RFI			HMSA
PZ-163	RFI			HMSA
RD-07	S	16	W	B56 Landfill
RD-14	S	7	W	Old Conservation Yard
RD-17	RFI		W	B4030/4093 Leachfields
RD-19	S	13	W	B4133
RD-20	S	18	W	B4100 Trench
RD-21	RFI		W	FSDF B4886
RD-22	RFI		W	FSDF B4886
RD-23	RFI		W	FSDF B4886
RD-24	RFI		W	B4057/4059/4626
RD-27	RFI		W	RMHF
RD-29	RFI		W	B4457 HMSA
RD-30	RFI		W	RMHF
RD-33A	S	17	W	FSDF B4886
RD-33B	S	17	W	FSDF B4886
RD-33C	S	17	W	FSDF B4886
RD-34A	S	13	W	RMHF
RD-34B	S	13	W	RMHF
RD-34C	S	13	W	RMHF

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SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
RD-54A	S	17	W	FSDF B4886
RD-54B	RFI		W	FSDF B4886
RD-54C	RFI		W	FSDF B4886
RD-59A	S	13, 14, 16, 17	W	Offsite
RD-59B	S	13, 14, 16, 17	W	Offsite
RD-59C	S	13, 14, 16, 17	W	Offsite
RD-63	S	13	W	RMHF
RD-64	RFI		W	FSDF B4886
RD-65	RFI		W	FSDF B4886
RD-74	RFI		W	B56 Landfill
RD-87	RFI		W	Tritium Plume
RD-88	RFI		W	Tritium Plume
RD-90	RFI		W	Tritium Plume
RD-93	RFI		W	Tritium Plume
RD-94	RFI		W	Tritium Plume
RD-95	RFI		W	Tritium Plume
RD-96	S	16	W	B4057/4059/4626
RD-97	RFI		W	B4057/4059/4626
RD-98	RFI		W	RMHF
RS-16	RFI		W	B56 Landfill
RS-18	S	17	W	FSDF B4886
RS-25	RFI		W	B133
RS-27	RFI		W	B4457 HMSA
RS-28	RFI		W	RMHF
RS-54	RFI		W	FSDF B4886
DS-43	RFI			B4057/4059/4626
DS-44	RFI			B4030/4093 Leachfields
DS-45	RFI			B4064
DS-46	RFI			FSDF B4886
DS-47	RFI			B4064
DD-139	RFI			FSDF B4886
DD-140	RFI			FSDF B4886
DD-141	RFI			B56 Landfill
DD-142	RFI			B4057/4059/4626
DD-143	RFI			RMHF
DD-144	RFI			B4457 HMSA

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SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA

Well ID	Sampling Program[1]	WQSAP Groundwater Impact Area	Water Level Monitoring Program	Location
DD-145	RFI			MC/DOE LF3
DD-146	RFI			B4457 HMSA
DD-147[2] (Formerly RD-89)	RFI		W	Tritium Plume
Seeps and Springs[3]				
				Nearest Impact Area
SP-900A				FSDF B4886
SP-900B				FSDF B4886
SP-900C				FSDF B4886
SP-19A				Tritium Plume
SP-19B				Tritium Plume
SP-T02A				Tritium Plume
SP-T02B				Tritium Plume
SP-T02C				Tritium Plume
SP-T02D				Tritium Plume
SP-424A				RMHF
SP-424B				RMHF
SP-424C				RMHF

NOTES AND ABBREVIATIONS

S Included in Site-Wide Sampling Program
W Included in Site-Wide Water Level Monitoring Program
RFI Collected as part of DOE Area IV GW RFI.
FSDF Former Sodium Disposal Facility
MC/DOE LF3 Metals Clarifier / DOE Leach Fields 3
HMSA Hazardous Materials Storage Area
RMHF Radioactive Materials Handling Facility

[1] Haley & Aldrich, 2010. Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Simi Hills, Ventura County, California, Revision 1, File No. 20090-456/556/656/M489. December.

[2] RD-89 was drilled to a deeper depth in May 2018. The well ID is now DD-147 and is 257 feet deep.

[3] Seeps and springs are monitored under a separate program.

TABLE 2
MODIFICATIONS TO MONITORING WELL NETWORK AND EQUIPMENT, 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELL MAINTENANCE

Well ID	Monitoring Program	Quarter Identified	Issue Identification Date	Issue	Issue Resolution	Quarter Resolved	Issue Resolution Date
RD-57	SW	2016Q1	3/10/2016	FLUTe was only partially removed due to an obstruction. Well cap welded shut.	No planned action at this time.	--	--
RD-74	SW	2014Q1	2/4/2014	Obstruction at about 95 feet bgs due to pump left in well. Total well depth is 101 feet.	Issue discussed with DTSC in March 2016. Well is dry. No planned action at this time.	--	--

EQUIPMENT MODIFICATIONS

Well ID	Monitoring Program	Quarter	Modification Date	Description
None				

WELL CONSTRUCTION

Well ID	Monitoring Program	Quarter	Completion Date	Description
DD-146	RFI	2018Q2	6/14/2018	140 feet bgs total depth, 6-inch steel casing to 120 feet bgs, 6-inch bedrock core to 140 feet bgs
DD-147	RFI	2018Q2	5/23/2018	257 feet bgs total depth, 8.5-inch steel casing to 30 feet bgs, 6-inch bedrock core to 257 feet bgs
PZ-162	RFI	2018Q2	4/24/2018	41.8 feet bgs total depth, 2-inch-diameter Schedule 40 PVC casing screened from 31 to 41 feet bgs
PZ-163	RFI	2018Q2	4/25/2018	40 feet bgs total depth, 2-inch-diameter Schedule 40 PVC casing screened from 30 to 40 feet bgs

WELL DEVELOPMENT

Well ID	Monitoring Program	Quarter	Development Date	Description
None				

Notes:
SW - Well monitored under Site-Wide Program
RFI - Groundwater RCRA Facility Investigation Program

TABLE 3
WATER LEVEL DATA, FOURTH QUARTER 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
PZ-097	Shallow	1761.87	11/19/2018	Dry	---	
PZ-108	Shallow	1809.36	11/19/2018	25.43	1783.93	
PZ-124	Shallow	1764.11	11/20/2018	Dry	---	
RD-07	Chatsworth	1812.82	11/20/2018	102.1	1710.72	
RD-14	Chatsworth	1824.18	11/20/2018	111.4	1712.78	
RD-17	Chatsworth	1836.30	11/19/2018	48.18	1788.12	
RD-19	Chatsworth	1853.16	11/19/2018	95.14	1758.02	
RD-20	Chatsworth	1819.52	11/19/2018	53.72	1765.8	
RD-21	Chatsworth	1866.96	11/19/2018	108.49	1758.47	
RD-22	Chatsworth	1853.41	11/19/2018	298.82	1554.59	
RD-23	Chatsworth	1838.19	11/20/2018	240.54	1597.65	
RD-24	Chatsworth	1809.93	11/19/2018	48.82	1761.11	
RD-27	Chatsworth	1841.67	11/19/2018	66.87	1774.8	
RD-29	Chatsworth	1806.29	11/19/2018	26.87	1779.42	
RD-30	Chatsworth	1768.69	11/20/2018	28.37	1740.32	
RD-33A	Chatsworth	1792.97	11/21/2018	211.25	1581.72	
RD-33B	Chatsworth	1793.72	11/21/2018	280.9	1512.82	
RD-33C	Chatsworth	1793.61	11/21/2018	283.06	1510.55	
RD-34A	Chatsworth	1761.91	11/20/2018	53.51	1708.4	
RD-34B	Chatsworth	1762.51	11/20/2018	68.45	1694.06	
RD-34C	Chatsworth	1762.79	11/20/2018	26.98	1735.81	
RD-50	Chatsworth	1914.88	10/8/2018	130.36	1784.52	
RD-54A	Chatsworth	1841.72	11/20/2018	180.72	1661	
RD-54B	Chatsworth	1842.54	11/20/2018	243.99	1598.55	
RD-54C	Chatsworth	1843.77	11/20/2018	232.4	1611.37	
RD-57	Chatsworth	1774.15	1/18/2018	NA	---	(5)
RD-59A	Chatsworth	1340.59	11/21/2018	28.54	1312.05	(2)
RD-59B	Chatsworth Artesian	1342.49	11/21/2018	19.0 psi	---	(1) (2)
RD-59C	Chatsworth Artesian	1345.41	11/21/2018	19.5 psi	---	(1) (2)

TABLE 3
WATER LEVEL DATA, FOURTH QUARTER 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
RD-63	Chatsworth	1764.83	11/20/2018	43.72	1721.11	
RD-64	Chatsworth	1857.04	11/20/2018	251.11	1605.93	
RD-65	Chatsworth	1819.14	11/20/2018	221.15	1597.99	
RD-74	Chatsworth	1810.90	11/20/2018	Dry	---	(3)
RD-87	Chatsworth	1789.09	11/20/2018	57.2	1731.89	
RD-88	Chatsworth	1774.62	11/20/2018	Dry	---	
RD-89	Chatsworth	1814.18	1/18/2018	Dry	---	(4)
RD-90	Chatsworth	1784.75	11/20/2018	48.56	1736.19	
RD-91	Chatsworth	1818.04	11/20/2018	102.91	1715.13	
RD-92	Chatsworth	1833.74	11/20/2018	74.78	1758.96	(2)
RD-93	Chatsworth	1810.48	11/20/2018	44.87	1765.61	
RD-94	Chatsworth	1744.38	11/20/2018	Dry	---	
RD-95	Chatsworth	1811.36	11/21/2018	68.91	1742.45	
RD-96	Chatsworth	1805.09	11/21/2018	79.92	1725.57	
RD-97	Chatsworth	1792.22	11/20/2018	71.25	1720.97	
RD-98	Chatsworth	1808.73	11/20/2018	59.45	1749.28	
RS-16	Shallow	1811.05	11/19/2018	Dry	---	
RS-18	Shallow	1802.86	11/19/2018	Dry	---	
RS-25	Shallow	1862.71	11/19/2018	Dry	---	
RS-27	Shallow	1804.78	11/20/2018	Dry	---	
RS-28	Shallow	1768.59	11/20/2018	Dry	---	
RS-54	Shallow	1846.66	11/19/2018	Dry	1805.21	
DS-43	Chatsworth	1809.52	11/20/2018	19.61	1789.91	
DS-44	Chatsworth	1851.21	11/20/2018	75.23	1775.98	
DS-45	Chatsworth	1866.58	11/19/2018	Dry	---	
DS-46	Chatsworth	1797.79	11/20/2018	42.92	1754.87	
DS-47	Chatsworth	1867.94	11/21/2018	112.47	1755.47	
DD-139	Chatsworth	1793.01	11/19/2018	182.24	1610.77	
DD-140	Chatsworth	1798.16	11/21/2018	159.16	1639.00	
DD-141	Chatsworth	1762.79	11/19/2018	79.15	1683.64	

TABLE 3
WATER LEVEL DATA, FOURTH QUARTER 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Geological Unit	Reference Point Elevation (feet above MSL)	Date of Measurement	Depth to Water (feet BTOC)	Static Water Level Elevation (feet above MSL)	Notes
DD-142	Chatsworth	1812.22	11/20/2018	64.6	1747.62	
DD-143	Chatsworth	1789.74	11/19/2018	49.16	1740.58	
DD-144	Chatsworth	1810.69	11/19/2018	27.09	1783.6	
DD-145	Chatsworth	1798.90	11/20/2018	30.88	1768.02	
DD-147	Chatsworth	1814.18	11/20/2018	53.34	1760.84	
C-8	Chatsworth	1842.23	11/20/2018	204.13	1638.1	

(1) = Pressure transducers installed on artesian well.
(2) = Boeing Gauging Data.
(3) = Obstruction; prior investigators left pump in well.
(4) = RD-89 was drilled to a deeper depth in May 2018. The well ID is now DD-147 and is 257 feet deep.
(5) = FLUTe partially removed, well lid has been welded shut.
--- = No data available or not applicable
BTOC = below top of casing.
Chatsworth = Chatsworth Formation groundwater unit.
Chatsworth Artesian = Chatsworth Formation groundwater unit - Artesian with hydrostatic head above land surface.
MSL = mean sea level.
PSI = pounds per square inch.
Shallow = Near surface groundwater unit.

TABLE 4
EXCEPTIONS TO THE SITE-WIDE WATER QUALITY SAMPLING AND ANALYSIS PLAN
2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

WELLS NOT SAMPLED	
Well Identifier	**Notes**
PZ-097, PZ-124, RS-18	Dry
RD-30	Dedicated submersible pump malfunction.
RD-57	FLUTe partially removed; well lid has been welded shut and well cannot be sampled.
STABLILIZATION CRITERIA COLLECTED AT FIXED INTERVALS GREATER THAN 5 MINUTES	
DD-139, DD-140, DD-142, DS-46, PZ-105, PZ-108, PZ-109, PZ-120, RD-20, RD-29, RD-90, RD-95, RD-96	Readings were collected every 6 to 7 minutes to give enough time to exchange water in the flow through cell due to 50 mL/min flow rate.
PURGE VOLUME REQUIREMENTS NOT MET	
Purge volume was met on all wells sampled.	
LOW-FLOW STABILIZATION CRITERIA NOT MET	
PZ-109, RD-96	Water level drawdown exceeded 0.3 feet.
QUALITY ASSURANCE PROJECT PLAN (QAPP) REQUIREMENTS	
Requirement	**Exceptions**
Trip Blanks submitted daily with samples analyzed for volatile organic compounds (VOCs), gasoline range organics, 1,4-Dioxane, and 1,2,3-Trichloropropane.	None
Quality control (QC) samples collected	See Appendix E
Precision/Accuracy requirements met	See Appendix E
OTHER	
Applicable Samples	The reporting limit for vinyl chloride was above the SSFL groundwater screening level reference value (SSFL screening criteria) maximum contaminant level (MCL) criterion of 0.5 microgram per liter (µg/L) at 1 µg/L. The method detection limit was 0.10 µg/L though and all sample results were nondetect so the 1 µg/L reporting limit is considered sufficient for project purposes. The reporting limit was also elevated for 1,2-dichloroethane at 1 µg/L (MDL 0.13). The MCL criterion is 0.5 µg/L for 1,2-dichloroethane. The reporting limit for gasoline range organics (GRO) is above the taste/odor threshold, but MDL (10 ug/L) was below the required criterion. The reporting limit for carbon tetrachloride was also above the SSFL screening criterion (MCL) of 0.5 µg/L at 1 µg/L. The MDL was 0.19 µg/L, which is below the criterion. If results had been detected between the MDL and reporting limit they would have been reported as detected estimated results. All these sample results are considered sufficient and meet project requirements.

TABLE 4
EXCEPTIONS TO THE SITE-WIDE WATER QUALITY SAMPLING AND ANALYSIS PLAN
2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

OTHER	
RD-34B	The pump intake could not be placed at a depth halfway between the depth to water (61.5 feet below ground surface) and the bottom of the saturated open interval of the well (415 feet below ground surface). Pump could not be lowered past the obstruction in well present at a depth of 167 feet below ground surface. The pump was placed immediately above the obstruction, and low-flow sampling procedures were followed for the collection of the water sample.

TABLE 5
GROUNDWATER FIELD PARAMETERS, 2018 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Date	Temperature (°C)	pH	Conductivity (mmhos)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation Reduction Potential (mV)
PZ-105	2/19/2018	17.70	7.08	1.346	5.56	15.0	143.2
PZ-108	2/19/2018	14.60	6.42	1.286	0.96	14.0	251.7
PZ-109	2/22/2018	15.90	6.72	1.279	1.14	16.0	216.0
PZ-120	2/26/2018	17.15	7.19	1.036	3.14	13.0	189.3
RD-07	2/26/2018	16.60	7.18	0.698	2.27	1.0	190.3
RD-14	3/2/2018	11.80	7.26	0.697	1.29	7.0	109.5
RD-17	3/2/2018	13.50	7.67	0.832	0.69	45.0	-72.7
RD-19	2/28/2018	19.68	6.80	1.904	1.04	4.0	165.1
RD-20	2/20/2018	12.80	6.46	1.629	3.41	1.0	228.7
RD-21	2/20/2018	16.96	7.47	0.798	3.45	11.0	151.2
RD-23	2/19/2018	16.05	7.19	0.871	4.73	12.0	92.1
RD-29	2/27/2018	12.30	6.87	0.854	0.81	12.0	193.8
RD-33A	3/1/2018	18.18	6.98	0.707	1.36	5.0	-30.1
RD-33A	8/21/2018	20.60	7.19	0.619	1.28	1.0	130.5
RD-33B	2/20/2018	18.61	7.91	0.495	3.98	8.0	-50.7
RD-33C	2/21/2018	17.61	7.38	0.821	2.10	10.0	-52.6
RD-33C	8/22/2018	20.20	8.86	281.200	1.58	9.0	37.8
RD-34A	3/2/2018	13.82	6.74	1.594	0.82	5.0	-20.1
RD-34B	3/1/2018	14.00	5.64	2.304	1.18	6.0	234.4
RD-34C	3/2/2018	17.06	7.56	0.670	0.57	7.0	-201.8
RD-54A	3/1/2018	16.70	6.75	0.940	2.42	23.0	162.4
RD-59A	2/28/2018	12.80	7.44	1.158	1.11	0.0	104.1
RD-59A	8/20/2018	18.90	6.93	1.172	0.47	5.0	239.7
RD-59B	2/28/2018	19.00	7.44	0.798	0.16	0.0	12.1
RD-59C	2/28/2018	20.00	7.76	0.829	0.09	0.0	31.9
RD-59C	8/20/2018	20.10	7.73	0.863	0.12	2.0	-30.9
RD-63	2/21/2018	18.38	6.89	1.344	0.90	9.0	-123.1
RD-65	2/27/2018	18.15	7.00	0.580	1.65	5.0	56.3
RD-90	2/22/2018	17.30	6.33	1.176	2.39	4.0	219.9
RD-95	2/22/2018	10.50	6.58	1.418	1.42	38.0	237.0
RD-96	2/21/2018	13.30	7.34	0.973	2.57	1.0	183.0
RD-98	2/28/2018	15.78	6.92	0.981	5.58	3.0	254.1
DD-139	2/22/2018	19.92	6.87	0.845	2.64	10.0	85.1
DD-140	2/27/2018	11.00	7.36	0.824	1.07	12.0	178.0
DD-141	2/27/2018	14.19	7.03	1.082	1.65	28.0	101.2
DD-142	2/22/2018	17.59	7.34	1.496	1.28	5.0	145.9
DD-143	2/26/2018	24.07	6.94	1.537	0.77	58.0	174.0
DD-144	2/22/2018	19.69	7.11	1.290	1.54	86.0	-19.1
DD-145	2/19/2018	16.70	6.81	0.956	1.17	15.0	183.4
DS-43	2/22/2018	19.20	5.75	1.119	0.40	54.0	242.7
DS-44	2/23/2018	18,8	7.09	1.210	1.86	17.0	97.3
DS-46	2/27/2018	11.10	6.95	0.973	1.36	15.0	199.9
DS-47	2/23/2018	18.10	7.03	0.739	1.79	2.0	196.0
C-8	2/19/2018	18.92	7.62	0.675	2.92	10.0	-522.0

NOTES AND ABBREVIATIONS

°C - degrees Celsius
mmhos - millimhos
mg/L - milligrams per liter
mV - millivolt
NTU - nephelometric turbidity unit

TABLE 6
SAMPLES ANALYZED, 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
PZ-105	2018 Q1	NA	VOCs Metals GRO, DRO Nitrates
PZ-108	2018 Q1	VOCs Metals	NA
PZ-109	2018 Q1	NA	VOCs
PZ-120	2018 Q1	NA	VOCs Metals Radiochemistry
RD-07	2018 Q1	VOCs Radiochemistry	Metals
RD-14	2018 Q1	VOCs 1,2,3-TCP Fluoride Radiochemistry	GRO, DRO
RD-17	2018 Q1	NA	VOCs Metals
RD-19	2018 Q1	VOCs Metals Radiochemistry Fluoride	GRO, DRO
RD-20	2018 Q1	VOCs Radiochemistry	Nitrates
RD-21	2018 Q1	NA	VOCs Metals Perchlorate
RD-23	2018 Q1	NA	VOCs
RD-29	2018 Q1	NA	VOCs
RD-33A	2018 Q1	VOCs Metals Perchlorate Radiochemistry	NA
RD-33A	2018 Q3	VOCs Metals Perchlorate Radiochemistry	<u>Additional resampling analyses to assess for tampering:</u> GRO, DRO Nitrate, Fluoride 1,2,3-TCP 1,4-Dioxane Tritium

TABLE 6
SAMPLES ANALYZED, 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
RD-33B	2018 Q1	VOCs Metals Perchlorate Radiochemistry	NA
RD-33C	2018 Q1	VOCs Metals Perchlorate Radiochemistry	NA
RD-33C	2018 Q3	VOCs Metals Perchlorate Radiochemistry	Additional resampling analyses to assess for tampering: GRO, DRO Nitrate, Fluoride 1,2,3-TCP 1,4-Dioxane Tritium
RD-34A	2018 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	GRO, DRO
RD-34B	2018 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	NA
RD-34C	2018 Q1	VOCs Metals Radiochemistry Fluoride 1,4-Dioxane	NA
RD-54A	2018 Q1	VOCs Metals Perchlorate Radiochemistry	GRO, DRO
RD-59A	2018 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA
RD-59A	2018 Q3	Strontium-90	NA

TABLE 6
SAMPLES ANALYZED, 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
RD-59B	2018 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA
RD-59C	2018 Q1	VOCs Metals Perchlorate Radiochemistry Fluoride	NA
RD-59C	2018 Q3	Strontium-90	NA
RD-63	2018 Q1	VOCs Radiochemistry	GRO, DRO
RD-65	2018 Q1	NA	VOCs 1,4 Dioxane
RD-90	2018 Q1	NA	Tritium
RD-95	2018 Q1	NA	Tritium
RD-96	2018 Q1	VOCs Radiochemistry	Perchlorate GRO, DRO Metals
RD-98	2018 Q1	NA	VOCs Radiochemistry
DS-43	2018 Q1	NA	VOCs Metals
DS-44	2018 Q1	NA	VOCs Metals Radiochemistry
DS-46	2018 Q1		VOCs Metals
DS-47	2018 Q1	NA	VOCs Metals Radiochemistry
DD-139	2018 Q1	NA	VOCs Metals Perchlorate
DD-140	2018 Q1	NA	VOCs Metals
DD-141	2018 Q1		VOCs Metals Perchlorate GRO, DRO Radiochemistry

TABLE 6
SAMPLES ANALYZED, 2018 – DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Event	Site-Wide Monitoring Program	DOE Area IV Groundwater RFI Analytes
DD-142	2018 Q1	NA	VOCs Metals
DD-143	2018 Q1	NA	VOCs Metals Radiochemistry
DD-144	2018 Q1	NA	VOCs Metals Tritium
DD-145	2018 Q1	NA	VOCs Metals GRO, DRO Nitrates
C-8	2018 Q1	NA	VOCs Metals

NOTES AND ABBREVIATIONS:
GW RFI - Groundwater RCRA Facility Investigation
DOE Area IV - Department of Energy Area IV
1,2,3-TCP - 1,2,3-Trichloropropane
DRO - Diesel Range Organics
GRO - Gasoline Range Organics
VOCs - Volatile Organic Compounds
NA - Not applicable

SSFL RADIOCHEMSTRY SUITE **
Gross Alpha and Gross Beta (Particulate & Dissolved)
Isotopic Uranium (Particulate & Dissolved)
Sr-90 (Particulate & Dissolved)
Am-241 (Particulate & Dissolved)
TM-171 (Particulate & Dissolved)
Cm-243/244, Cm-245/246 (Particulate & Dissolved)
Pu-238, Pu-239/240, Pu-242 (Particulate & Dissolved)
C-14 (Particulate & Dissolved)
I-129 (Particulate & Dissolved)
** - beginning 1st QTR 2015, particulate analysis is not performed. Total and dissolved radionuclide results provided.

TABLE 7
GROUNDWATER MONITORING PROGRAM ANALYSES, 2018 - DOE AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Analytes			Analytical Method
1,2,3-Trichloropropane			8260B/E524.2
1,4-Dioxane			8260B SIM
Fluoride, Nitrate			300.0
Metals[1]:	Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium,		6010C/6020A/7470A
	Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potasium,		
	Delenium, Silver, Sodium, Strontium, Thallium, Tin, Vanadium, Zinc		
Perchlorate			6860
Radiochemistry:	Cesium-137 and other Gamma-emitting radionuclides[2]		901.1
	Gross Alpha and Gross Beta		900.0
	Radium-226		903.0
	Radium-228		904.0
	Strontium-90		905.0/ASTM D5811-95
	Tritium		906.0
	Isotopic Uranium		DOE A-01-R
Gasoline Range Organics			8015B
Diesel Range Organics			8015B
Volatile Organic Compounds:			8260B
	1,1,1-Trichloroethane	cis-1,2-Dichloroethene	
	1,1,2-Trichloro-1,2,2-trifluoroethane	Dibromofluoromethane (Surr)	
	1,1,2-Trichloroethane	Ethylbenzene	
	1,1-Dichloroethane	Methylene Chloride	
	1,1-Dichloroethene	Tetrachloroethene	
	1,2-Dichloroethane	Toluene	
	1,2-Dichloroethane-d4 (Surr)	Toluene-d8 (Surr)	
	2-Butanone (MEK)	trans-1,2-Dichloroethene	
	4-Bromofluorobenzene (Surr)	Trichloroethene	
	Acetone	Trichlorofluoromethane	
	Benzene	Vinyl Chloride	
	Carbon Tetrachloride	Xylenes (Total)	
	Chloroform		

Notes:

[1] Metal analyses include total and dissolved fractions

[2] Radionuclides by Method 901.1: Actinium-228, Americium-241, Antimony-125, Barium-133, Cesium-134, Cesium-137, Cobalt-57, Cobalt-60, Europium-152, Europium-154, Europium-155, Manganese-54, Potassium-40, Sodium-22.

MEK - Methyl Ethyl Ketone

Laboratories: Test America, St. Louis; Test America, Denver; Test America, Irvine

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Radiochemistry	Actinium-228		pCi/L					
Radiochemistry	Antimony-125	300	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Barium-133	1520	pCi/L	Primary MCL [(b)]	X	NA	NA	NA
Radiochemistry	Barium-137m	2150000	pCi/L	Primary MCL [(b)]	X	NA	NA	NA
Radiochemistry	Bismuth-212		pCi/L					
Radiochemistry	Bismuth-214		pCi/L					
Radiochemistry	Carbon-14	2000	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Cesium-134	80	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Cesium-137	200	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Cobalt-57	1000	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Cobalt-60	100	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Europium-152	200	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Gross alpha	15	pCi/L	Primary MCL				
Radiochemistry	Gross beta	50	pCi/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Radiochemistry	Gross beta	4	mrem/yr	Primary MCL	X	NA	NA	NA
Radiochemistry	Iodine-129	1	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Lead-210		pCi/L					
Radiochemistry	Lead-212		pCi/L					
Radiochemistry	Lead-214		pCi/L					
Radiochemistry	Potassium-40		pCi/L					
Radiochemistry	Manganese-54	300	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Neptunium-236	5960	pCi/L	Primary MCL [(b)]	X	NA	NA	NA
Radiochemistry	Niobium-94	707	pCi/L	Primary MCL [(b)]	X	NA	NA	NA
Radiochemistry	Radium-226/228	5	pCi/L	Primary MCL	X	5	Primary MCL	pCi/L

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Radiochemistry	Sodium-22	400	pCi/L	Primary MCL [(a)]	X	NA	NA	NA
Radiochemistry	Strontium-90	8	pCi/L	Primary MCL	X	NA	NA	NA
Radiochemistry	Thallium-208		pCi/L					
Radiochemistry	Thorium-234		pCi/L		X	NA	NA	NA
Radiochemistry	Thulium-171	1000	pCi/L	Primary MCL [(a)]				
Radiochemistry	Tin-126	293	pCi/L	Primary MCL [(b)]	X	NA	NA	NA
Radiochemistry	Tritium	20000	pCi/L	Primary MCL	X	NA	NA	NA
Radiochemistry	Uranium-233/234	20	pCi/L	Cal MCL	X	NA	NA	NA
Radiochemistry	Uranium-235	20	pCi/L	Cal MCL	X	NA	NA	NA
Radiochemistry	Uranium-238	20	pCi/L	Cal MCL	X	NA	NA	NA
Halogenated Ethenes	1,2-Dichloroethenes	130	µg/L	SWGW RBSL				
Halogenated Ethenes	Chlorotrifluoroethylene		µg/L					
Halogenated Ethenes	Tetrachloroethene	5	µg/L	Primary MCL				
Halogenated Ethenes	Trichloroethene	5	µg/L	Primary MCL				
Halogenated Ethenes	cis-1,2-Dichloroethene	6	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethenes	trans-1,2-Dichloroethene	10	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethenes	1,1-Dichloroethene	6	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethenes	Vinyl chloride	0.5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethanes	1,1,1,2-Tetrachloroethane		µg/L					
Halogenated Ethanes	1,1,2,2-Tetrachloroethane	1	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Halogenated Ethanes	1,1,2-Trichloroethane	5	µg/L	Primary MCL				
Halogenated Ethanes	1,1,1-Trichloroethane	200	µg/L	Primary MCL				
Halogenated Ethanes	1,2-Dichloroethane	0.5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethanes	1,1-Dichloroethane	5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Ethanes	Chloroethane	16	µg/L	Taste/Odor				
Halogenated Ethanes	2-Chloro-1,1,1-trifluoroethane		µg/L					
Halogenated Ethanes	1,2-Dibromoethane	0.05	µg/L	Primary MCL				
Halogenated Ethanes	Dichlorodifluoroethane		µg/L					
Halogenated Ethanes	1,1,2-Trichloro-1,2,2-trifluoroethane	1200	µg/L	Cal MCL	X	190000	SWGW RBSL	µg/L
Halogenated Ethanes	1,2-Dichloro-1,1,2-trifluoroethane	190000	µg/L	SWGW RBSL				
Halogenated Ethanes	Dichlorotrifluoroethane		µg/L					
Halogenated Ethanes	2,2-Dichloro-1,1,1-trifluoroethane	190000	µg/L	SWGW RBSL				
Halogenated Ethanes	Trichlorotrifluorethane		µg/L					
Halogenated Methanes	Dichlorofluoromethane		µg/L		X	1000	Notification Limit	µg/L
Halogenated Methanes	Isocyanomethane		µg/L					
Halogenated Methanes	Carbon Tetrachloride	0.5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Methanes	Chloroform	80	µg/L	Primary MCL				
Halogenated Methanes	Methylene chloride	5	µg/L	Primary MCL				
Halogenated Methanes	Chloromethane	5.7	µg/L	SWGW RBSL				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Halogenated Methanes	Trichlorofluoromethane	150	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Methanes	Dichlorodifluoromethane	1000	µg/L	Notification Level				
Halogenated Methanes	Bromochloromethane	34000	µg/L	Taste/Odor				
Halogenated Methanes	Bromodichloromethane	80	µg/L	Primary MCL				
Halogenated Methanes	Bromoform	80	µg/L	Primary MCL				
Halogenated Methanes	Bromomethane	8.8	µg/L	SWGW RBSL				
Halogenated Methanes	Dibromochloromethane	80	µg/L	Primary MCL				
Halogenated Methanes	Dibromomethane		µg/L					
Halogenated Methanes	Iodomethane		µg/L					
Non-Halogenated VOCs	Total Complex Matrix		µg/L					
Non-Halogenated VOCs	1-Chlorohexane		µg/L					
Non-Halogenated VOCs	1-Hexanol		µg/L					
Non-Halogenated VOCs	1-Octanol		µg/L					
Non-Halogenated VOCs	2-Heptanone	280	µg/L	Taste/Odor				
Non-Halogenated VOCs	2-Naphthaleneethanol		µg/L					
Non-Halogenated VOCs	Acetic Acid Ester		µg/L					
Non-Halogenated VOCs	Acetic Acid, 2-Methylpropyl Ester		µg/L					
Non-Halogenated VOCs	Acetic Acid, Butyl Ester		µg/L					
Non-Halogenated VOCs	Acetic Acid, Hexyl Ester		µg/L					
Non-Halogenated VOCs	Benzene, 1-Bromo-3-fluoro-		µg/L					
Non-Halogenated VOCs	Benzyl chloride	12	µg/L	Taste/Odor				
Non-Halogenated VOCs	Butanoic Acid, Ethyl Ester		µg/L					
Non-Halogenated VOCs	Butyl Cyclooctane		µg/L					
Non-Halogenated VOCs	Cumene	770	µg/L	Notification Level				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Non-Halogenated VOCs	Ethanol	760000	µg/L	Taste/Odor				
Non-Halogenated VOCs	Ethanone, 1-(2,4,6-Trihydroxyphenyl)-		µg/L					
Non-Halogenated VOCs	Ethyl acetate	2600	µg/L	Taste/Odor				
Non-Halogenated VOCs	Ethyl cyanide		µg/L					
Non-Halogenated VOCs	Ethyl ether	750	µg/L	Taste/Odor				
Non-Halogenated VOCs	Formic acid, octyl ester		µg/L					
Non-Halogenated VOCs	Heptanal		µg/L					
Non-Halogenated VOCs	Hexanoic Acid, Ethyl Ester		µg/L					
Non-Halogenated VOCs	Methanol	740000	µg/L	Taste/Odor				
Non-Halogenated VOCs	Methyl sulfide		µg/L					
Non-Halogenated VOCs	m-Xylene & p-Xylene	1750	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	Naphthalene, 1-(2-Propenyl)-		µg/L					
Non-Halogenated VOCs	n-Hexane	6.4	µg/L	Taste/Odor				
Non-Halogenated VOCs	Octanal		µg/L					
Non-Halogenated VOCs	p-Cymene		µg/L					
Non-Halogenated VOCs	Pentanal	17	µg/L	Taste/Odor				
Non-Halogenated VOCs	Propanoic Acid, 2-Methyl-, ethyl ester		µg/L					
Non-Halogenated VOCs	sec-Butyl alcohol	19000	µg/L	Taste/Odor				
Non-Halogenated VOCs	tert-Butyl alcohol	12	µg/L	Notification Level	X	NA	NA	NA
Non-Halogenated VOCs	tert-Butyl ethyl ether		µg/L					
Non-Halogenated VOCs	Tetrahydrofuran		µg/L					
Non-Halogenated VOCs	Tetramethylurea		µg/L					
Non-Halogenated VOCs	Trimethylcyclopentane Isomer		µg/L					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Non-Halogenated VOCs	1,3,5-Trimethylbenzene	330	µg/L	Notification Level				
Non-Halogenated VOCs	Biphenyl		µg/L					
Non-Halogenated VOCs	1,2,4-Trimethylbenzene	330	µg/L	Notification Level				
Non-Halogenated VOCs	2-Hexanone	250	µg/L	Taste/Odor				
Non-Halogenated VOCs	Acetone	20000	µg/L	Taste/Odor				
Non-Halogenated VOCs	Acetonitrile	300000	µg/L	Taste/Odor				
Non-Halogenated VOCs	Acrolein	110	µg/L	Taste/Odor				
Non-Halogenated VOCs	Acrylonitrile	910	µg/L	Taste/Odor				
Non-Halogenated VOCs	Benzene	1	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	Carbon Disulfide	160	µg/L	Notification Level				
Non-Halogenated VOCs	Diisopropyl ether		µg/L					
Non-Halogenated VOCs	Ethane	7500	µg/L	Taste/Odor				
Non-Halogenated VOCs	Ethyl methacrylate		µg/L					
Non-Halogenated VOCs	Ethylbenzene	300	µg/L	Cal MCL				
Non-Halogenated VOCs	Ethylene	39	µg/L	Taste/Odor				
Non-Halogenated VOCs	Isobutanol		µg/L					
Non-Halogenated VOCs	Isopropanol	160000	µg/L	Taste/Odor				
Non-Halogenated VOCs	m-Xylene	1750	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	Methacrylonitrile	2100	µg/L	Taste/Odor				
Non-Halogenated VOCs	Methane	3100	µg/L	SWGW RBSL				
Non-Halogenated VOCs	Methyl ethyl ketone	3800	µg/L	SWGW RBSL				
Non-Halogenated VOCs	Methyl isobutyl ketone (MIBK)	120	µg/L	Notification Level	X	500	SWGW RBSL	µg/L
Non-Halogenated VOCs	Methyl methacrylate	25	µg/L	Taste/Odor				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Non-Halogenated VOCs	Methyl tert-butyl ether	5	µg/L	Secondary MCL	X	NA	Cal MCL (incorrect)	NA
Non-Halogenated VOCs	n-Butylbenzene	260	µg/L	Notification Level				
Non-Halogenated VOCs	n-Propylbenzene	260	µg/L	Notification Level				
Non-Halogenated VOCs	Naphthalene	17	µg/L	Notification Level	X	170	Notification Level	µg/L
Non-Halogenated VOCs	o + p Xylene	1750	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	o-Xylene	1750	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	sec-Butylbenzene	260	µg/L	Notification Level				
Non-Halogenated VOCs	Styrene	100	µg/L	Primary MCL				
Non-Halogenated VOCs	tert-Amyl methyl ether		µg/L					
Non-Halogenated VOCs	tert-Butylbenzene	260	µg/L	Notification Level				
Non-Halogenated VOCs	Toluene	150	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Non-Halogenated VOCs	Vinyl acetate	88	µg/L	Taste/Odor				
Non-Halogenated VOCs	Xylenes, Total	1750	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Benzenes	1,4-Dichlorobenzene-d4		µg/L					
Halogenated Benzenes	1,2,3-Trichlorobenzene	2.1	µg/L	SWGW RBSL				
Halogenated Benzenes	1,2,4-Trichlorobenzene	5	µg/L	Cal MCL				
Halogenated Benzenes	1,2-Dichlorobenzene	600	µg/L	Primary MCL				
Halogenated Benzenes	1,3-Dichlorobenzene	600	µg/L	Archived Advisory Level	X	600	Notification Level	µg/L
Halogenated Benzenes	1,4-Dichlorobenzene	5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Halogenated Benzenes	Bromobenzene		µg/L					
Halogenated Benzenes	Chlorobenzene	70	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Benzenes	Dichlorobenzenes		µg/L					
Halogenated Propene/Propanes	cis-1,4-Dichloro-2-butene		µg/L					
Halogenated Propene/Propanes	Dichloropropane		µg/L					
Halogenated Propene/Propanes	sec-Dichloropropane		µg/L					
Halogenated Propene/Propanes	1,1-Dichloropropene		µg/L					
Halogenated Propene/Propanes	1,2,3-Trichloropropane	0.005	µg/L	Notification Level				
Halogenated Propene/Propanes	3-Chloro-2(Chloromethyl)-1-Propene		µg/L					
Halogenated Propene/Propanes	1,2-Dibromo-3-chloropropane	0.2	µg/L	Primary MCL				
Halogenated Propene/Propanes	1,2-Dichloropropane	5	µg/L	Primary MCL				
Halogenated Propene/Propanes	1,3-Dichloropropane	130	µg/L	SWGW RBSL				
Halogenated Propene/Propanes	1,3-Dichloropropene	0.5	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Halogenated Propene/Propanes	Allyl chloride	8.9	µg/L	Taste/Odor				
Halogenated Propene/Propanes	cis-1,3-Dichloropropene	0.5	µg/L	Cal MCL	X	NA	NA	NA
Halogenated Propene/Propanes	trans-1,3-Dichloropropene	0.81	µg/L	SWGW RBSL				
Other Halogenated VOCs	1,1-Dichlorobutane		µg/L					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Other Halogenated VOCs	o-Chlorotoluene	140	µg/L	Notification Level	X	NA	NA	NA
Other Halogenated VOCs	p-Chlorotoluene	140	µg/L	Notification Level	X	NA	NA	NA
Other Halogenated VOCs	Total Organic Halogens		µg/L					
Other Halogenated VOCs	trans-1,4-Dichloro-2-butene		µg/L					
Other Halogenated VOCs	Hexachlorobutadiene		µg/L					
Other Halogenated VOCs	Chloroprene		µg/L					
Other Halogenated VOCs	2-Chloroethylvinyl ether		µg/L					
1,4-Dioxane	1,4-Dioxane	1	µg/L	Notification Level	X	3	Notification Level	µg/L
SVOC	2-n-Butoxyethanol		µg/L					
SVOC	Amino Hexanoic Acid		µg/L					
SVOC	Benzene Alcohol		µg/L					
SVOC	Benzophenone		µg/L					
SVOC	Carboxylic Acid		µg/L					
SVOC	Decanol		µg/L					
SVOC	Dibenzyl Ether		µg/L					
SVOC	Dichloro Alkene		µg/L					
SVOC	Dichloromethylpropene		µg/L					
SVOC	Dichloropropene, NOS		µg/L					
SVOC	Dimethyl Decene		µg/L					
SVOC	Dimethyl Undecane		µg/L					
SVOC	Diphenyl ether	630	µg/L	SWGW RBSL				
SVOC	Molecular Sulfur		µg/L					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
SVOC	p-Cresol	63	µg/L	SWGW RBSL				
SVOC	p-Dinitrobenzene	1.3	µg/L	SWGW RBSL				
SVOC	Trimethyl Decane		µg/L					
SVOC	1,1-Dimethylhydrazine		µg/L					
SVOC	1,2-Dinitrobenzene		µg/L					
SVOC	1-Chloronaphthalene		µg/L					
SVOC	1-Nitronaphthalene		µg/L					
SVOC	2,3,4-Trichlorophenol		µg/L					
SVOC	4-Am-2,6-DNT		µg/L					
SVOC	4-Nitroquinoline-1-oxide		µg/L					
SVOC	Acetamidofluorene		µg/L					
SVOC	alpha, alpha-Dimethylphenethylamine		µg/L					
SVOC	alpha-Naphthylamine		µg/L					
SVOC	alpha-Picoline		µg/L					
SVOC	beta-Naphthylamine		µg/L					
SVOC	Carbazole		µg/L					
SVOC	Decamethylcyclopentasiloxane		µg/L					
SVOC	Diazinon	1.2	µg/L	Notification Level	X	6	Notification Level	µg/L
SVOC	Dibenz(a,j)acridine		µg/L					
SVOC	Diethyl phthalate	10000	µg/L	SWGW RBSL				
SVOC	Ethylene glycol	14000	µg/L	Notification Level				
SVOC	Formaldehyde	100	µg/L	Notification Level				
SVOC	Hydrazine	160000	µg/L	Taste/Odor				
SVOC	m+p Cresol		µg/L					
SVOC	m-Cresol	37	µg/L	Taste/Odor				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
SVOC	Monomethylhydrazine		µg/L					
SVOC	o-Cresol	630	µg/L	SWGW RBSL				
SVOC	p-Chloroaniline		µg/L					
SVOC	p-Nitroaniline		µg/L					
SVOC	Surfactants		µg/L					
SVOC	sym-Trinitrobenzene		µg/L					
SVOC	Zinophos		µg/L					
SVOC	1,1'-Phenylene-Bis-Ethanone		µg/L					
SVOC	1,2,3-Trichloropropene	0.005	µg/L	Notification Level				
SVOC	1,2,4,5-Tetrachlorobenzene		µg/L					
SVOC	1,2-Diphenylhydrazine		µg/L					
SVOC	1,3-Dinitrobenzene	1.3	µg/L	SWGW RBSL				
SVOC	1,4-Naphthoquinone		µg/L					
SVOC	2,3,4,6-Tetrachlorophenol		µg/L					
SVOC	2,4,5-Trichlorophenol		µg/L					
SVOC	2,4,6-Trichlorophenol	2.1	µg/L	SWGW RBSL				
SVOC	2,4-Dichlorophenol		µg/L					
SVOC	2,4-Dimethylphenol	100	µg/L	Archived Advisory Level	X	100	Notification Level	µg/L
SVOC	2,4-Dinitrophenol		µg/L					
SVOC	2,4-Dinitrotoluene		µg/L					
SVOC	2,6-Dichlorophenol		µg/L					
SVOC	2,6-Dinitrotoluene	0.22	µg/L	SWGW RBSL				
SVOC	2-Butoxyethoxyethanol		µg/L					
SVOC	2-Chloronaphthalene		µg/L					
SVOC	2-Chlorophenol	63	µg/L	SWGW RBSL				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
SVOC	2-Nitroaniline		µg/L					
SVOC	2-Nitrophenol		µg/L					
SVOC	3,3'-Dichlorobenzidine	0.12	µg/L	SWGW RBSL				
SVOC	3-Methylcholanthrene		µg/L					
SVOC	3-Nitroaniline		µg/L					
SVOC	4,6-Dinitro-o-cresol	1.3	µg/L	SWGW RBSL				
SVOC	4-Aminobiphenyl		µg/L					
SVOC	4-Bromophenyl phenyl ether		µg/L					
SVOC	4-Chlorophenylphenyl ether		µg/L					
SVOC	4-Nitrophenol		µg/L					
SVOC	5-Nitro-o-toluidine		µg/L					
SVOC	7,12-Dimethylbenz(a)anthracene		µg/L					
SVOC	Acetophenone		µg/L					
SVOC	Alkene		µg/L					
SVOC	Aniline	65000	µg/L	Taste/Odor				
SVOC	Aramite		µg/L					
SVOC	Azobenzene		µg/L					
SVOC	Benzidine	0.0003	µg/L	SWGW RBSL				
SVOC	Benzo (b+k) fluoranthene (Total)		µg/L					
SVOC	Benzoic acid	50000	µg/L	SWGW RBSL				
SVOC	Benzyl alcohol		µg/L					
SVOC	bis(2-Chloroethoxy)methane	38	µg/L	SWGW RBSL				
SVOC	bis(2-Chloroethyl) ether	360	µg/L	Taste/Odor				
SVOC	bis(2-Chloroisopropyl) ether		µg/L					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
SVOC	bis(2-Ethylhexyl) phthalate	4	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
SVOC	Butyl benzyl phthalate	78	µg/L	SWGW RBSL				
SVOC	Di-n-butyl phthalate	1300	µg/L	SWGW RBSL				
SVOC	Di-n-octyl phthalate	500	µg/L	SWGW RBSL				
SVOC	Dibenzofuran		µg/L					
SVOC	Dimethyl phthalate	130000	µg/L	SWGW RBSL				
SVOC	Diphenylamine		µg/L					
SVOC	Ethyl methanesulfonate		µg/L					
SVOC	Hexachlorobenzene	1	µg/L	Primary MCL				
SVOC	Hexachlorocyclopentadiene	50	µg/L	Primary MCL				
SVOC	Hexachloroethane	10	µg/L	Taste/Odor				
SVOC	Hexachlorophene		µg/L					
SVOC	Hexachloropropene		µg/L					
SVOC	Isodrin		µg/L					
SVOC	Isophorone	5400	µg/L	Taste/Odor				
SVOC	Isosafrole		µg/L					
SVOC	Methapyrilene		µg/L					
SVOC	Methyl methanesulfonate		µg/L					
SVOC	n-Nitrosodi-n-butylamine		µg/L					
SVOC	n-Nitrosodi-n-propylamine	0.01	µg/L	Notification Level				
SVOC	n-Nitrosodiethylamine	0.01	µg/L	Notification Level				
SVOC	n-Nitrosodiphenylamine	16	µg/L	SWGW RBSL				
SVOC	n-Nitrosomethylethylamine		µg/L					
SVOC	n-Nitrosomorpholine		µg/L					

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
SVOC	n-Nitrosopiperidine		µg/L					
SVOC	n-Nitrosopyrrolidine		µg/L					
SVOC	Nitrobenzene	110	µg/L	Taste/Odor				
SVOC	o,o,o-Triethylphosphorothioate		µg/L					
SVOC	o-Tolidine		µg/L					
SVOC	o-Toluidine	11000	µg/L	Taste/Odor				
SVOC	p-Chloro-m-cresol		µg/L					
SVOC	p-Dimethylaminoazobenzene		µg/L					
SVOC	p-Phenylenediamine		µg/L					
SVOC	Pentachlorobenzene		µg/L					
SVOC	Pentachloroethane		µg/L					
SVOC	Pentachloronitrobenzene	20	µg/L	Archived Advisory Level	X	20	Notification Level	µg/L
SVOC	Pentachlorophenol	1	µg/L	Primary MCL				
SVOC	Phenacetin		µg/L					
SVOC	Phenol	4200	µg/L	Archived Advisory Level	X	4200	Notification Level	µg/L
SVOC	Pronamide		µg/L					
SVOC	Pyridine	950	µg/L	Taste/Odor				
SVOC	Safrole		µg/L					
SVOC	Tetrachloropropene		µg/L					
PAH	1-Methyl naphthalene		µg/L					
PAH	2-Methylnaphthalene	50	µg/L	SWGW RBSL				
PAH	Acenaphthene		µg/L					
PAH	Acenaphthylene		µg/L					
PAH	Anthracene	3800	µg/L	SWGW RBSL				

TABLE 8
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SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
PAH	Benzo(a)anthracene		µg/L		X	0.1	Primary MCL (no longer current)	µg/L
PAH	Benzo(a)pyrene	0.2	µg/L	Primary MCL				
PAH	Benzo(b)fluoranthene		µg/L					
PAH	Benzo(ghi)perylene		µg/L					
PAH	Benzo(k)fluoranthene		µg/L					
PAH	Chrysene		µg/L					
PAH	Dibenzo(a,h)anthracene		µg/L					
PAH	Fluoranthene		µg/L					
PAH	Fluorene		µg/L					
PAH	Indeno(1,2,3-cd)pyrene		µg/L					
PAH	Phenanthrene	3800	µg/L	SWGW RBSL				
PAH	Pyrene	380	µg/L	SWGW RBSL				
NDMA	n-Nitrosodimethylamine	0.01	µg/L	Notification Level				
Energetics	Perchlorate	6	µg/L	Cal MCL	X	6	Notification Level	µg/L
Energetics	2-Amino-4,6-Dinitrotoluene		µg/L					
Energetics	2-Nitrotoluene		µg/L					
Energetics	3-Nitrotoluene		µg/L					
Energetics	4-Nitrotoluene		µg/L					
Energetics	Nitroglycerin		µg/L					
Energetics	PETN		µg/L					
Energetics	Tetryl		µg/L					
Energetics	2,4,6-Trinitrotoluene	1	µg/L	Notification Level	X	NA	NA	NA
Energetics	HMX	350	µg/L	Notification Level				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Energetics	RDX	0.3	µg/L	Notification Level	X	NA	NA	NA
TPH	Fuel Hydrocarbons, C4-C12, as heavy Hydrocarbons	500	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C14, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C15, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C16, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C16, C21-C24, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C7	500	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C6-C7, C10-C16, as kerosene		µg/L					
TPH	Fuel Hydrocarbons, C7-C10, as gasoline	5	µg/L	Taste/Odor				
TPH	Fuel Hydrocarbons, C7-C14, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C7-C16, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C8-C10, as gasoline	5	µg/L	Taste/Odor				
TPH	Fuel Hydrocarbons, C8-C12, as heavy Hydrocarbons	1800	µg/L	SWGW RBSL				
TPH	Fuel Hydrocarbons, C8-C14, as heavy Hydrocarbons	1800	µg/L	SWGW RBSL				
TPH	Gasoline Range Organics (C4-C12)	5	µg/L	Taste/Odor				
TPH	Gasoline Range Organics (C6-C14)	5	µg/L	Taste/Odor				
TPH	Gasoline Range Organics (C6-C7)		µg/L					
TPH	Gasoline Range Organics (C7-C12)	5	µg/L	Taste/Odor				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
TPH	Total Extractable Hydrocarbons C10-C18		µg/L					
TPH	Total Hydrocarbons C8-C18		µg/L					
TPH	Diesel Range Organics	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C12-C14)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C13-C22)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C14-C20)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C15-C20)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C20-C30)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C21-C24)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C21-C30)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C8-C11)	100	µg/L	Taste/Odor				
TPH	Diesel Range Organics (C8-C30)	100	µg/L	Taste/Odor				
TPH	Fuel Hydrocarbons, C6-C17, as JP-4	1800	µg/L	SWGW RBSL				
TPH	Gasoline Range Organics (C8-C11)	1800	µg/L	SWGW RBSL				
TPH	Jet Fuel 4 (C6-C13)	1800	µg/L	SWGW RBSL				
TPH	Kerosene (C10-C12)	1800	µg/L	SWGW RBSL				
TPH	Kerosene (C10-C14)	1800	µg/L	SWGW RBSL				
TPH	Kerosene (C6-C14)		µg/L					
TPH	Kerosene Range Organics (C11-C14)	1800	µg/L	SWGW RBSL				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
TPH	Oil Range Organics (C23-C32)		µg/L					
TPH	Total Petroleum Hydrocarbons		µg/L					
TPH	Total Petroleum Hydrocarbons (as Kerosene)	1800	µg/L	SWGW RBSL				
TPH	Total Volatile Hydrocarbons		µg/L					
TPH	Gasoline Range Organics	5	µg/L	Taste/Odor				
TPH	Gasoline Range Organics (C6-C12)	5	µg/L	Taste/Odor				
TPH	TRPH		µg/L					
TPH	Total Extractable Hydrocarbons C16-C25		µg/L					
TPH	Petroleum Hydrocarbons		µg/L					
PCB	Aroclor 1016	0.5	µg/L	Primary MCL				
PCB	Polychlorinated biphenyls	0.5	µg/L	Primary MCL				
PCB	Aroclor 1254	0.5	µg/L	Primary MCL				
PCB	Aroclor 1260	0.5	µg/L	Primary MCL				
PCB	Aroclor 1221	0.5	µg/L	Primary MCL				
PCB	Aroclor 1232	0.5	µg/L	Primary MCL				
PCB	Aroclor 1242	0.5	µg/L	Primary MCL				
PCB	Aroclor 1248	0.5	µg/L	Primary MCL				
Herbicides	2,4,5-Trichlorophenoxypropionic acid (Silvex)	50	µg/L	Cal MCL	X	NA	NA	NA
Herbicides	2,4-Dichlorophenoxyacetic Acid (2,4-D)	130	µg/L	SWGW RBSL				
Herbicides	2,4,5-T	130	µg/L	SWGW RBSL				
Herbicides	Dalapon	200	µg/L	Cal MCL	X	NA	NA	NA
Herbicides	Dinoseb	7	µg/L	Primary MCL				

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SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Herbicides	MCPP		µg/L					
Herbicides	Propachlor	90	µg/L	Notification Level	X	NA	NA	NA
Pesticides	4,4'-DDT		µg/L					
Pesticides	a-Chlordane		µg/L					
Pesticides	Chlorobenzilate		µg/L					
Pesticides	Diallate		µg/L					
Pesticides	Famphur		µg/L					
Pesticides	Kepone	0.0093	µg/L	SWGW RBSL				
Pesticides	Endosulfan I	75	µg/L	SWGW RBSL				
Pesticides	Endosulfan II	75	µg/L	SWGW RBSL				
Pesticides	Endrin ketone		µg/L					
Pesticides	gamma-BHC	0.2	µg/L	Primary MCL				
Pesticides	gamma-Chlordane		µg/L					
Pesticides	Methyl parathion	2	µg/L	Archived Advisory Level	X	2	Notification Level	µg/L
Pesticides	p,p'-Methoxychlor	30	µg/L	Cal MCL	X	NA	NA	µg/L
Pesticides	Parathion	40	µg/L	Archived Advisory Level	X	40	Notification Level	µg/L
Pesticides	Tetra ethyldithiopyrophosphate		µg/L					
Pesticides	y-Chlordane		µg/L					
Pesticides	Endosulfan sulfate	75	µg/L	SWGW RBSL				
Pesticides	4,4'-DDE	0.44	µg/L	SWGW RBSL				
Pesticides	Aldrin	0.002	µg/L	Archived Advisory Level	X	0.002	Notification Level	µg/L
Pesticides	alpha-BHC	0.015	µg/L	Archived Advisory Level	X	0.015	Notification Level	µg/L
Pesticides	beta-BHC	0.025	µg/L	Archived Advisory Level	X	0.025	Notification Level	µg/L

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SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Pesticides	Chlordane	0.1	µg/L	Cal MCL	X	1	Primary MCL	µg/L
Pesticides	delta-BHC		µg/L		X	0.025	Notification Level	µg/L
Pesticides	Dieldrin	0.002	µg/L	Archived Advisory Level	X	0.002	Notification Level	µg/L
Pesticides	Dimethoate	1	µg/L	Archived Advisory Level	X	1	Notification Level	µg/L
Pesticides	Dimethoate							
Pesticides	Disulfoton		µg/L					
Pesticides	4,4'-DDD	0.62	µg/L	SWGW RBSL				
Pesticides	Toxaphene	3	µg/L	Primary MCL				
Pesticides	Endrin	2	µg/L	Primary MCL				
Pesticides	Endrin aldehyde		µg/L					
Pesticides	Heptachlor	0.01	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Pesticides	Heptachlor epoxide	0.01	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Pesticides	Phorate		µg/L					
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin		µg/L					
Dioxins/Furans	1,2,3,4,7,8,9-Heptachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin		µg/L					

TABLE 8
GROUNDWATER SCREENING REFERENCE VALUES
SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin		µg/L					
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin		µg/L					
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzofuran		µg/L					
Dioxins/Furans	1,2,3,7,8-Pentachlorodibenzo-p-dioxin		µg/L					
Dioxins/Furans	2,3,4,6,7,8-Hexachlorodibenzofuran		µg/L					
Dioxins/Furans	2,3,4,7,8-Pentachlorodibenzofuran		µg/L					
Dioxins/Furans	2,3,7,8-Tetrachlorodibenzofuran		µg/L					
Dioxins/Furans	Heptachlorodibenzofurans		µg/L					
Dioxins/Furans	Heptachlorodibenzo-p-dioxins		µg/L					
Dioxins/Furans	Hexachlorodibenzofurans		µg/L					
Dioxins/Furans	Hexachlorodibenzo-p-dioxins		µg/L					
Dioxins/Furans	Octachlorodibenzofuran		µg/L					
Dioxins/Furans	Octachlorodibenzo-p-dioxin		µg/L					
Dioxins/Furans	PCDFs (Furans)		µg/L					
Dioxins/Furans	Pentachlorodibenzofurans		µg/L					
Dioxins/Furans	Pentachlorodibenzo-p-dioxins		µg/L					
Dioxins/Furans	Tetrachlorodibenzofurans		µg/L					

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SANTA SUSANA FIELD LABORATORY
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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Dioxins/Furans	Tetrachlorodibenzo-p-dioxins		µg/L					
Dioxins/Furans	1,3,4,7,8-PeCDF		µg/L					
Dioxins/Furans	PCDDs (Dioxins)		µg/L					
Dioxins/Furans	2,3,7,8-TCDD	0.00003	µg/L	Primary MCL				
Metals	Aluminum, Dissolved	13000	µg/L	SWGW RBSL				
Metals	Boron, Dissolved	340	µg/L	SSFL Comparison				
Metals	Tin, Dissolved	2.4	µg/L	SSFL Comparison				
Metals	Antimony, Dissolved	2.5	µg/L	SSFL Comparison				
Metals	Arsenic, Dissolved	7.7	µg/L	SSFL Comparison				
Metals	Barium, Dissolved	150	µg/L	SSFL Comparison				
Metals	Beryllium, Dissolved	0.14	µg/L	SSFL Comparison				
Metals	Cadmium, Dissolved	0.2	µg/L	SSFL Comparison				
Metals	Chromium, Dissolved	14	µg/L	SSFL Comparison				
Metals	Cobalt, Dissolved	1.9	µg/L	SSFL Comparison				
Metals	Copper, Dissolved	4.7	µg/L	SSFL Comparison				
Metals	Hexavalent Chromium, Dissolved	38	µg/L	SWGW RBSL				
Metals	Iron, Dissolved	4100	µg/L	SSFL Comparison				
Metals	Lead, Dissolved	11	µg/L	SSFL Comparison				
Metals	Magnesium, Dissolved	77000	µg/L	SSFL Comparison				
Metals	Manganese, Dissolved	150	µg/L	SSFL Comparison				
Metals	Mercury, Dissolved	0.063	µg/L	SSFL Comparison				
Metals	Molybdenum, Dissolved	2.2	µg/L	SSFL Comparison				
Metals	Nickel, Dissolved	17	µg/L	SSFL Comparison				
Metals	Potassium, Dissolved	9600	µg/L	SSFL Comparison				
Metals	Selenium, Dissolved	1.6	µg/L	SSFL Comparison				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Metals	Silver, Dissolved	0.17	µg/L	SSFL Comparison				
Metals	Sodium, Dissolved	190000	µg/L	SSFL Comparison				
Metals	Strontium, Dissolved	800	µg/L	SSFL Comparison				
Metals	Thallium, Dissolved	0.13	µg/L	SSFL Comparison				
Metals	Vanadium, Dissolved	2.6	µg/L	SSFL Comparison				
Metals	Zinc, Dissolved	6300	µg/L	SSFL Comparison				
Metals	Zirconium		µg/L					
Metals	Zirconium, dissolved		µg/L					
Metals	Aluminum	200	µg/L	Secondary MCL				
Metals	Antimony	2.5	µg/L	SSFL Comparison				
Metals	Arsenic	7.7	µg/L	SSFL Comparison				
Metals	Barium	150	µg/L	SSFL Comparison				
Metals	Beryllium	0.14	µg/L	SSFL Comparison				
Metals	Boron	340	µg/L	SSFL Comparison				
Metals	Cadmium	0.2	µg/L	SSFL Comparison				
Metals	Chromium	14	µg/L	SSFL Comparison				
Metals	Cobalt	1.9	µg/L	SSFL Comparison				
Metals	Copper	4.7	µg/L	SSFL Comparison				
Metals	Hexavalent Chromium	14	µg/L	SSFL Comparison				
Metals	Iron	4100	µg/L	SSFL Comparison				
Metals	Lead	11	µg/L	SSFL Comparison				
Metals	Magnesium	77000	µg/L	SSFL Comparison				
Metals	Manganese	150	µg/L	SSFL Comparison				
Metals	Mercury	0.063	µg/L	SSFL Comparison				
Metals	Molybdenum	2.2	µg/L	SSFL Comparison				
Metals	Nickel	17	µg/L	SSFL Comparison				

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Metals	Potassium	9600	µg/L	SSFL Comparison				
Metals	Selenium	1.6	µg/L	SSFL Comparison				
Metals	Silver	0.17	µg/L	SSFL Comparison				
Metals	Sodium	190000	µg/L	SSFL Comparison				
Metals	Strontium	800	µg/L	SSFL Comparison				
Metals	Thallium	0.13	µg/L	SSFL Comparison				
Metals	Tin	2.4	µg/L	SSFL Comparison				
Metals	Vanadium	2.6	µg/L	SSFL Comparison				
Metals	Zinc	6300	µg/L	SSFL Comparison				
Inorganics	Carbon Dioxide		µg/L					
Inorganics	Dissolved Organic Carbon		µg/L					
Inorganics	Phosphite (PO3)		µg/L					
Inorganics	Bicarbonate		µg/L					
Inorganics	Calcium, Dissolved		µg/L					
Inorganics	Carbonate		µg/L					
Inorganics	Chlorine	4000	µg/L	Primary MCL				
Inorganics	Iron Oxide		µg/L					
Inorganics	Nitrate-NO3	45000	µg/L	Cal MCL				
Inorganics	Redox Potential		mV					
Inorganics	Silica, Dissolved		µg/L					
Inorganics	Silicon, Dissolved		µg/L					
Inorganics	Specific gravity		No Units					
Inorganics	Sulfide, Dissolved		µg/L					
Inorganics	Alkalinity		µg/L					
Inorganics	Alkalinity as CaCO3		µg/L					
Inorganics	Ammonia-N		µg/L					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
Inorganics	Bicarbonate Alkalinity as CaCO3		µg/L					
Inorganics	Bromide		µg/L					
Inorganics	Carbonate Alkalinity as CaCO3		µg/L					
Inorganics	Calcium		µg/L					
Inorganics	Cation/Anion Balance (%)		%					
Inorganics	Chloride	250000	µg/L	Secondary MCL				
Inorganics	Chlorate	0.8	µg/L	Notification Level	X	NA	NA	NA
Inorganics	Dissolved oxygen		µg/L					
Inorganics	Cyanides	150	µg/L	Cal MCL	X	NA	Primary MCL (incorrect)	NA
Inorganics	Fluoride	800	µg/L	SSFL Comparison				
Inorganics	Nitrate-N	10000	µg/L	Primary MCL				
Inorganics	Nitrite-N	1000	µg/L	Primary MCL				
Inorganics	Phosphate		µg/L					
Inorganics	Sulfate	376000	µg/L	SSFL Comparison				
Inorganics	Sulfide		µg/L					
Inorganics	Total Dissolved Solids	500000	µg/L	Recommended SMCL	X			
Inorganics	Total Dissolved Solids	1000000	µg/L	Upper SMCL	X			
Inorganics	Total Dissolved Solids	1500000	µg/L	Short-Term SMCL	X			
Inorganics	Total Kjeldahl nitrogen		µg/L					
Inorganics	Total Organic Carbon		µg/L					
Inorganics	Total Suspended Solids		µg/L					
General Parameters	Ammonium		µg/L					
General Parameters	Bulk Density		pcf					

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Analyte Group	Chemical Analyte	Screening Value	Units	Screening Type	Updated	Previous SL	Previous Screen Type	Units
General Parameters	Deuterium		permil					
General Parameters	Formic Acid	1700000	µg/L	Taste/Odor				
General Parameters	Hydraulic Conductivity		cm/sec					
General Parameters	Moisture		%					
General Parameters	Oxygen-18		permil					
General Parameters	pH		pH Units					
General Parameters	Porosity, Total		%					
General Parameters	Total Non-Volatile Solids		µg/L					
General Parameters	Total Solids		µg/L					
General Parameters	volumetric saturation (air)		%					
General Parameters	Turbidity	5	NTU	Secondary MCL	X	1	Primary MCL	NTU
General Parameters	Specific conductivity	900	µmhos/cm	Recommended SMCL	X			
General Parameters	Specific conductivity	1600	µmhos/cm	Upper SMCL	X			
General Parameters	Specific conductivity	2200	µmhos/cm	Short-Term SMCL	X			
General Parameters	Hardness		µg/L					
General Parameters	Coliform bacteria		MPN/100 mL					

NOTES AND ABBREVIATIONS
Cal MCL - California Primary Maximum Contaminant Level
NDMA - n-Nitrosodimethylamine
PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
Primary MCL - Primary Maximum Contaminant Level
Taste/Odor - Taste/Odor Threshold
TPH - total petroleum hydrocarbons
Secondary MCL - Secondary Maximum Contaminant Level
SMCL - Secondary Maximum Contaminant Level
SSFL Comparison - site-specific values for metals developed by DTSC
SVOC - semi volatile organic compound

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SWGW RBSL - Site-Wide Groundwater Risk-Based Screening Level proposed in GW RI Report (MWH, 2009)
VOCs - volatile organic compounds
(a) - isotope-specific MCL for beta emitters based on Primary MCL of 4 mrem/yr critical organ dose limit for gross beta (EPA, 2000)
(b) - isotope-specific MCL for beta emitters based on the 4 mrem/yr effective dose equivalent for gross beta (EPA, 2000)

SOURCES:

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TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
1,1-dichloroethene	RD-23	Total	30	µg/L	J/J	No	Yes	02/05/2000	Cal MCL	6	µg/L	Yes
1,4-dioxane	DS-46	Total	1.5	µg/L		No	Yes	06/01/2016	Notification Level	1	µg/L	Yes
	RD-34B	Total	0.48	µg/L	J/J	Yes	Yes		Notification Level	1	µg/L	No
Acetone	RD-59A	Total	8.2	µg/L	J/J	No	Yes	02/28/2007	Taste/Odor	20000	µg/L	No
	RD-98	Total	8.7	µg/L	J/J	No	Yes	06/01/2017	Taste/Odor	20000	µg/L	No
Actinium-228	RD-20	Total	36.6	pCi/L		Yes	Yes					
Aluminum	C-8	Total	0.11	mg/L		No	Yes	06/01/2017	Secondary MCL	200	µg/L	No
	DD-139	Total	0.47	mg/L	/J+	No	Yes	06/01/2017	Secondary MCL	200	µg/L	Yes
	DD-140	Dissolved	0.039	mg/L	J/J	No	Yes	06/01/2017	SWGW RBSL	13000	µg/L	No
	DD-141	Dissolved	0.062	mg/L	J/J	No	Yes	06/01/2017	SWGW RBSL	13000	µg/L	No
		Total	2	mg/L		No	Yes	06/01/2016	Secondary MCL	200	µg/L	Yes
	DD-142	Total	0.98	mg/L	F1/J+	No	Yes	06/01/2017	Secondary MCL	200	µg/L	Yes
	DS-43	Dissolved	0.28	mg/L	B/	Yes	Yes		SWGW RBSL	13000	µg/L	No
	PZ-108	Dissolved	0.036	mg/L	J/J	Yes	Yes		SWGW RBSL	13000	µg/L	No
		Total	0.29	mg/L		Yes	Yes		Secondary MCL	200	µg/L	Yes
	PZ-120	Dissolved	0.097	mg/L	J/J	Yes	Yes		SWGW RBSL	13000	µg/L	No
		Total	1.6	mg/L		No	Yes	06/01/2017	Secondary MCL	200	µg/L	Yes
	RD-33A	Total	0.018	mg/L	J/J	Yes	Yes		Secondary MCL	200	µg/L	No
	RD-54A	Dissolved	0.043	mg/L	J/J	Yes	Yes		SWGW RBSL	13000	µg/L	No
		Total	2.3	mg/L		No	Yes	06/01/2017	Secondary MCL	200	µg/L	Yes
Antimony	DS-46	Dissolved	0.00068	mg/L	J/J	Yes	Yes		SSFL Comparison	2.5	µg/L	No
		Total	0.00068	mg/L	J/J	Yes	Yes		SSFL Comparison	2.5	µg/L	No
	PZ-120	Total	0.0015	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.5	µg/L	No
Arsenic	DD-141	Dissolved	0.00085	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	7.7	µg/L	No
		Total	0.0015	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	7.7	µg/L	No
	DD-142	Total	0.0011	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	7.7	µg/L	No
	DD-144	Dissolved	0.00092	mg/L	J/J	Yes	Yes		SSFL Comparison	7.7	µg/L	No
	DS-46	Total	0.00038	mg/L	J/J	Yes	Yes		SSFL Comparison	7.7	µg/L	No
	PZ-120	Total	0.0028	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	7.7	µg/L	No
	RD-33A	Total	0.0032	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	7.7	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
Barium	C-8	Dissolved	0.052	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	DS-46	Dissolved	0.057	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
		Total	0.052	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	PZ-105	Total	0.032	mg/L		No	Yes	02/11/2014	SSFL Comparison	150	µg/L	No
	PZ-108	Dissolved	0.026	mg/L		No	Yes	06/01/2015	SSFL Comparison	150	µg/L	No
	PZ-120	Dissolved	0.014	mg/L		No	Yes	02/11/2014	SSFL Comparison	150	µg/L	No
		Total	0.046	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	RD-07	Dissolved	0.036	mg/L		No	Yes	06/01/2015	SSFL Comparison	150	µg/L	No
	RD-17	Dissolved	0.12	mg/L		No	Yes	02/10/2014	SSFL Comparison	150	µg/L	No
		Total	0.13	mg/L	B/	No	Yes	02/10/2014	SSFL Comparison	150	µg/L	No
Beryllium	DD-141	Dissolved	0.00021	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	Yes
		Total	0.00017	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	0.14	µg/L	Yes
	DD-142	Total	0.00011	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	No
	DD-143	Total	0.00013	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	0.14	µg/L	No
	DD-144	Dissolved	0.00045	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	Yes
	DS-43	Total	0.00011	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	No
	DS-44	Dissolved	0.000096	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	No
	PZ-120	Total	0.00012	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	No
	RD-33A	Total	0.00012	mg/L	J/J	Yes	Yes		SSFL Comparison	0.14	µg/L	No
Boron	DD-139	Total	0.035	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	DD-140	Dissolved	0.03	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.035	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	DD-143	Dissolved	0.085	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.083	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	340	µg/L	No
	DD-144	Dissolved	0.14	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	DS-43	Dissolved	0.16	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.16	mg/L		No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	DS-44	Total	0.09	mg/L	J/J	Yes	Yes		SSFL Comparison	340	µg/L	No
	DS-46	Total	0.038	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	DS-47	Dissolved	0.039	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.042	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	PZ-108	Dissolved	0.17	mg/L	B/	Yes	Yes		SSFL Comparison	340	µg/L	No
		Total	0.18	mg/L		Yes	Yes		SSFL Comparison	340	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	PZ-120	Dissolved	1.4	mg/L		No	Yes	06/01/2017	SSFL Comparison	340	µg/L	Yes
	RD-07	Total	0.088	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-17	Dissolved	0.15	mg/L		Yes	Yes		SSFL Comparison	340	µg/L	No
		Total	0.14	mg/L		Yes	Yes		SSFL Comparison	340	µg/L	No
	RD-33A	Dissolved	0.021	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.024	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-33B	Dissolved	0.024	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-33C	Dissolved	0.032	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-34B	Total	0.021	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-34C	Total	0.021	mg/L	J/J	Yes	Yes		SSFL Comparison	340	µg/L	No
	RD-54A	Dissolved	0.025	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-59B	Dissolved	0.074	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
	RD-96	Dissolved	0.025	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
		Total	0.028	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	340	µg/L	No
Cadmium	PZ-120	Total	0.00034	mg/L	J/J	Yes	Yes		SSFL Comparison	0.2	µg/L	Yes
Calcium	DD-139	Dissolved	110	mg/L	B/	No	Yes	06/01/2017				
		Total	110	mg/L		No	Yes	06/01/2017				
	DD-140	Dissolved	100	mg/L		No	Yes	06/01/2017				
		Total	110	mg/L		No	Yes	06/01/2017				
	DD-142	Total	110	mg/L		No	Yes	06/01/2017				
	DD-143	Dissolved	170	mg/L		No	Yes	06/01/2017				
		Total	160	mg/L		No	Yes	06/01/2016				
	DD-144	Dissolved	120	mg/L	B/	No	Yes	06/01/2017				
	DS-43	Total	86	mg/L		No	Yes	06/01/2017				
	DS-44	Total	110	mg/L		No	Yes	06/01/2017				
	DS-46	Dissolved	120	mg/L		No	Yes	06/01/2017				
		Total	130	mg/L		No	Yes	06/01/2017				
	DS-47	Dissolved	79	mg/L		No	Yes	06/01/2017				
		Total	85	mg/L		No	Yes	06/01/2017				
	PZ-105	Total	110	mg/L		No	Yes	06/01/2017				
	PZ-108	Dissolved	130	mg/L		Yes	Yes					
		Total	140	mg/L		Yes	Yes					
	PZ-120	Total	73	mg/L		No	Yes	04/02/2003				

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	RD-07	Total	97	mg/L		No	Yes	06/01/2017				
	RD-17	Dissolved	100	mg/L		No	Yes	09/21/1989				
		Total	100	mg/L		Yes	Yes					
	RD-19	Total	210	mg/L		No	Yes	06/01/2017				
	RD-21	Dissolved	110	mg/L		No	Yes	09/12/1989				
		Total	110	mg/L		No	Yes	06/01/2017				
	RD-33A	Total	65	mg/L		No	Yes	06/01/2016				
	RD-34A	Dissolved	160	mg/L		No	Yes	06/01/2017				
	RD-34C	Total	49	mg/L		No	Yes	06/01/2017				
	RD-54A	Total	110	mg/L		No	Yes	06/01/2017				
	RD-96	Total	120	mg/L		No	Yes	06/01/2017				
Chromium	DD-141	Total	0.005	mg/L		No	Yes	06/01/2016	SSFL Comparison	14	µg/L	No
	DD-142	Total	0.0025	mg/L		No	Yes	06/01/2016	SSFL Comparison	14	µg/L	No
	DD-144	Dissolved	0.00061	mg/L	J/J	Yes	Yes		SSFL Comparison	14	µg/L	No
	PZ-105	Total	0.0051	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	14	µg/L	No
	PZ-108	Dissolved	0.0016	mg/L	J/J	No	Yes	01/31/2012	SSFL Comparison	14	µg/L	No
	PZ-120	Dissolved	0.0045	mg/L		No	Yes	06/01/2017	SSFL Comparison	14	µg/L	No
		Total	0.011	mg/L		No	Yes	06/01/2017	SSFL Comparison	14	µg/L	No
	RD-19	Total	0.00065	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	14	µg/L	No
	RD-54A	Total	0.0053	mg/L		No	Yes	06/01/2017	SSFL Comparison	14	µg/L	No
cis-1,2-Dichloroethene	C-8	Total	4.8	µg/L		No	Yes	06/01/2017	Cal MCL	6	µg/L	No
Cobalt	C-8	Dissolved	0.00073	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
		Total	0.00095	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
	DD-141	Total	0.01	mg/L		No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	Yes
	DD-142	Total	0.00092	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	1.9	µg/L	No
	DD-143	Dissolved	0.00022	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
	DD-144	Dissolved	0.00067	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
	DS-44	Dissolved	0.00034	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	1.9	µg/L	No
	PZ-105	Dissolved	0.000062	mg/L	J/J	Yes	Yes		SSFL Comparison	1.9	µg/L	No
		Total	0.00036	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
	PZ-108	Dissolved	0.00012	mg/L	J/J	No	Yes	07/18/2011	SSFL Comparison	1.9	µg/L	No
	PZ-120	Dissolved	0.00035	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	No
		Total	0.0025	mg/L		No	Yes	04/02/2003	SSFL Comparison	1.9	µg/L	Yes

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	RD-17	Dissolved	0.0015	mg/L		No	Yes	02/10/2014	SSFL Comparison	1.9	µg/L	No
		Total	0.0016	mg/L		No	Yes	02/10/2014	SSFL Comparison	1.9	µg/L	No
	RD-34A	Total	0.0018	mg/L		No	Yes	01/28/2013	SSFL Comparison	1.9	µg/L	No
	RD-54A	Total	0.0067	mg/L		No	Yes	06/01/2017	SSFL Comparison	1.9	µg/L	Yes
Cobalt-57	RD-19	Dissolved	7.38	pCi/L		Yes	Yes		Primary MCL (a)	1000	pCi/L	No
Cobalt-60	PZ-120	Total	7.26	pCi/L		Yes	Yes		Primary MCL (a)	100	pCi/L	No
	RD-59A	Dissolved	8.29	pCi/L		Yes	Yes		Primary MCL (a)	100	pCi/L	No
	RD-96	Total	10.7	pCi/L		Yes	Yes		Primary MCL (a)	100	pCi/L	No
Copper	DD-142	Total	0.0035	mg/L	B/	No	Yes	06/01/2016	SSFL Comparison	4.7	µg/L	No
	DD-143	Total	0.0013	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	4.7	µg/L	No
	DD-144	Dissolved	0.00061	mg/L	J/J	Yes	Yes		SSFL Comparison	4.7	µg/L	No
	DS-44	Dissolved	0.00056	mg/L	J/J	Yes	Yes		SSFL Comparison	4.7	µg/L	No
	DS-46	Dissolved	0.0016	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	4.7	µg/L	No
		Total	0.0014	mg/L	J/J	Yes	Yes		SSFL Comparison	4.7	µg/L	No
	PZ-105	Total	0.0021	mg/L		No	Yes	06/01/2017	SSFL Comparison	4.7	µg/L	No
	PZ-108	Dissolved	0.0016	mg/L	J/J	No	Yes	01/31/2012	SSFL Comparison	4.7	µg/L	No
	PZ-120	Dissolved	0.0045	mg/L		No	Yes	06/01/2017	SSFL Comparison	4.7	µg/L	No
		Total	0.046	mg/L		No	Yes	04/02/2003	SSFL Comparison	4.7	µg/L	Yes
	RD-54A	Total	0.035	mg/L		No	Yes	06/01/2017	SSFL Comparison	4.7	µg/L	Yes
Diesel Range Organics [C10-C28]	PZ-105	Total	520	µg/L		No	Yes	06/01/2017	Taste/Odor	0.1	mg/L	Yes
	RD-14	Total	43	µg/L	J/J	No	Yes	06/01/2016	Taste/Odor	0.1	mg/L	Yes
	RD-54A	Total	58	µg/L	J/J	Yes	Yes		Taste/Odor	0.1	mg/L	Yes
	RD-63	Total	46	µg/L	J/J	Yes	Yes		Taste/Odor	0.1	mg/L	Yes
	RD-96	Total	51	µg/L	J/J	No	Yes	06/01/2016	Taste/Odor	0.1	mg/L	Yes
Europium-152	RD-34B	Total	22.2	pCi/L		Yes	Yes		Primary MCL (a)	200	pCi/L	No
Europium-154	RD-34B	Dissolved	44.9	pCi/L		Yes	Yes					
	RD-98	Total	46.1	pCi/L		Yes	Yes					
Fluoride	RD-19	Total	0.41	mg/L	J/J	No	Yes	07/18/2011	SSFL Comparison	800	µg/L	No
	RD-34B	Total	0.69	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
Gasoline Range Organics [C6-C10]	DD-141	Total	55	µg/L	F1/J	Yes	Yes					
	PZ-105	Total	11	µg/L	J/J	Yes	Yes					
	RD-54A	Total	57	µg/L	/J	Yes	Yes					

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Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
Gross Alpha	DD-141	Total	19	pCi/L	G/	No	Yes	06/01/2017	Primary MCL	15	pCi/L	Yes
	RD-33C	Total	7.1	pCi/L		No	Yes	07/24/2009	Primary MCL	15	pCi/L	No
	RD-59C	Total	3.86	pCi/L		No	Yes	08/04/2009	Primary MCL	15	pCi/L	No
	RD-63	Total	15.9	pCi/L	G/	No	Yes	02/02/2010	Primary MCL	15	pCi/L	Yes
Gross Beta	DD-141	Total	18.9	pCi/L		No	Yes	06/01/2017	Cal MCL	50	pCi/L	No
	DS-44	Total	11.9	pCi/L		No	Yes	06/01/2016	Cal MCL	50	pCi/L	No
Iron	C-8	Total	0.32	mg/L		No	Yes	06/01/2016	SSFL Comparison	4100	µg/L	No
	DD-139	Total	1.4	mg/L	/J+	No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	DD-141	Total	3.3	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	DD-142	Total	1.5	mg/L	F1/J+	No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	DD-144	Dissolved	4.5	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	Yes
	DD-145	Dissolved	0.11	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	DS-44	Dissolved	0.24	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	DS-46	Dissolved	0.87	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	PZ-105	Total	0.64	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	PZ-108	Dissolved	0.094	mg/L	J/J	Yes	Yes		SSFL Comparison	4100	µg/L	No
		Total	0.49	mg/L		Yes	Yes		SSFL Comparison	4100	µg/L	No
	PZ-120	Dissolved	0.18	mg/L		Yes	Yes		SSFL Comparison	4100	µg/L	No
		Total	2.4	mg/L		No	Yes	04/02/2003	SSFL Comparison	4100	µg/L	No
	RD-17	Dissolved	6.2	mg/L		Yes	Yes		SSFL Comparison	4100	µg/L	Yes
		Total	7.4	mg/L		Yes	Yes		SSFL Comparison	4100	µg/L	Yes
	RD-33B	Total	0.74	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	RD-33C	Dissolved	2.1	mg/L		No	Yes	02/15/2002	SSFL Comparison	4100	µg/L	No
	RD-34B	Total	0.57	mg/L		No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
	RD-34C	Dissolved	1.6	mg/L		No	Yes	02/14/2002	SSFL Comparison	4100	µg/L	No
	RD-59C	Total	0.022	mg/L	J/J	No	Yes	12/04/2003	SSFL Comparison	4100	µg/L	No
	RD-96	Total	0.057	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	4100	µg/L	No
Lead	C-8	Total	0.00025	mg/L	J^/J+	Yes	Yes		SSFL Comparison	11	µg/L	No
	DD-142	Total	0.0013	mg/L	B/	No	Yes	06/01/2016	SSFL Comparison	11	µg/L	No
	DD-143	Total	0.0011	mg/L		No	Yes	06/01/2017	SSFL Comparison	11	µg/L	No
	DD-144	Dissolved	0.00053	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	11	µg/L	No
	DS-43	Dissolved	0.00024	mg/L	J/J	Yes	Yes		SSFL Comparison	11	µg/L	No
	DS-44	Dissolved	0.00032	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	11	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	PZ-105	Total	0.00038	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	11	µg/L	No
	PZ-120	Dissolved	0.0012	mg/L	B/	Yes	Yes		SSFL Comparison	11	µg/L	No
		Total	0.02	mg/L		No	Yes	06/01/2017	SSFL Comparison	11	µg/L	Yes
	RD-17	Total	0.0083	mg/L		No	Yes	02/10/2014	SSFL Comparison	11	µg/L	No
Magnesium	DD-139	Dissolved	15	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
		Total	15	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DD-140	Dissolved	21	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
		Total	22	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DD-141	Total	26	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DD-142	Total	22	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DD-143	Total	31	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DS-44	Total	21	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DS-46	Dissolved	18	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
		Total	19	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	DS-47	Dissolved	19	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
		Total	20	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	PZ-105	Total	21	mg/L	/J	No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	PZ-108	Dissolved	31	mg/L	/J	Yes	Yes		SSFL Comparison	77000	µg/L	No
		Total	33	mg/L	/J	Yes	Yes		SSFL Comparison	77000	µg/L	No
	RD-07	Total	14	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	RD-17	Dissolved	23	mg/L		No	Yes	09/21/1989	SSFL Comparison	77000	µg/L	No
		Total	22	mg/L		Yes	Yes		SSFL Comparison	77000	µg/L	No
	RD-19	Total	42	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	RD-21	Dissolved	6.9	mg/L	/J	No	Yes	09/12/1989	SSFL Comparison	77000	µg/L	No
		Total	6.8	mg/L	/J	No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	RD-33A	Total	14	mg/L		No	Yes	06/01/2016	SSFL Comparison	77000	µg/L	No
	RD-54A	Total	8.7	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
	RD-96	Total	37	mg/L		No	Yes	06/01/2017	SSFL Comparison	77000	µg/L	No
Manganese	DD-139	Dissolved	0.01	mg/L		Yes	Yes		SSFL Comparison	150	µg/L	No
		Total	0.057	mg/L	^/J+	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	DD-140	Dissolved	0.1	mg/L	F1/J-	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
		Total	0.1	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	DD-141	Total	0.43	mg/L		No	Yes	06/01/2016	SSFL Comparison	150	µg/L	Yes

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	DD-142	Total	0.18	mg/L	^/	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	Yes
	DD-143	Dissolved	0.074	mg/L	/J	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	DD-145	Dissolved	0.023	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	DS-44	Dissolved	0.089	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
		Total	0.19	mg/L	^/J	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	Yes
	DS-47	Dissolved	0.0015	mg/L	B/J+	Yes	Yes		SSFL Comparison	150	µg/L	No
	PZ-105	Total	0.035	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	PZ-108	Dissolved	0.049	mg/L		Yes	Yes		SSFL Comparison	150	µg/L	No
		Total	0.065	mg/L		Yes	Yes		SSFL Comparison	150	µg/L	No
	PZ-120	Dissolved	0.069	mg/L	/J	Yes	Yes		SSFL Comparison	150	µg/L	No
		Total	1.1	mg/L		No	Yes	04/02/2003	SSFL Comparison	150	µg/L	Yes
	RD-07	Total	0.0045	mg/L		No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	RD-17	Dissolved	0.18	mg/L		Yes	Yes		SSFL Comparison	150	µg/L	Yes
		Total	0.18	mg/L	B/	Yes	Yes		SSFL Comparison	150	µg/L	Yes
	RD-33A	Total	0.018	mg/L	B/	No	Yes	06/01/2016	SSFL Comparison	150	µg/L	No
	RD-33B	Total	0.034	mg/L	^/	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	No
	RD-33C	Dissolved	0.16	mg/L	B/	No	Yes	02/15/2002	SSFL Comparison	150	µg/L	Yes
	RD-34A	Dissolved	0.13	mg/L		No	Yes	05/16/2003	SSFL Comparison	150	µg/L	No
		Total	0.18	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	Yes
	RD-34C	Dissolved	0.047	mg/L		No	Yes	02/24/2004	SSFL Comparison	150	µg/L	No
	RD-59A	Total	0.35	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	150	µg/L	Yes
Mercury	RD-54A	Total	0.00023	mg/L		No	Yes	06/01/2017	SSFL Comparison	0.063	µg/L	Yes
Molybdenum	DD-140	Dissolved	0.0045	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
		Total	0.0042	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	DD-144	Dissolved	0.0015	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
	DD-145	Dissolved	0.0022	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	DS-43	Total	0.0028	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	DS-44	Total	0.0081	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	DS-46	Dissolved	0.00051	mg/L	J/J	Yes	Yes		SSFL Comparison	2.2	µg/L	No
	PZ-108	Dissolved	0.0085	mg/L		Yes	Yes		SSFL Comparison	2.2	µg/L	Yes
		Total	0.0081	mg/L	B/	Yes	Yes		SSFL Comparison	2.2	µg/L	Yes
	PZ-120	Dissolved	0.017	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	RD-17	Dissolved	0.00058	mg/L	J/J	Yes	Yes		SSFL Comparison	2.2	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
		Total	0.00053	mg/L	J/J	Yes	Yes		SSFL Comparison	2.2	µg/L	No
	RD-19	Dissolved	0.00076	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
		Total	0.00075	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
	RD-21	Total	0.0023	mg/L	B/	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	RD-33A	Total	0.0013	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
	RD-33B	Total	0.0022	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	RD-34B	Dissolved	0.0025	mg/L		No	Yes	02/06/2003	SSFL Comparison	2.2	µg/L	Yes
	RD-59A	Total	0.0024	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	Yes
	RD-59B	Total	0.0015	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
	RD-59C	Total	0.0012	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	2.2	µg/L	No
Nickel	DD-141	Total	0.0055	mg/L		No	Yes	06/01/2016	SSFL Comparison	17	µg/L	No
	DD-142	Total	0.0018	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	17	µg/L	No
	DD-143	Dissolved	0.00092	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	17	µg/L	No
	DD-144	Dissolved	0.0026	mg/L		No	Yes	06/01/2016	SSFL Comparison	17	µg/L	No
	PZ-105	Total	0.0014	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	17	µg/L	No
	PZ-108	Dissolved	0.0023	mg/L		No	Yes	01/31/2012	SSFL Comparison	17	µg/L	No
	PZ-120	Total	0.012	mg/L		No	Yes	02/11/2014	SSFL Comparison	17	µg/L	No
	RD-07	Total	0.00037	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	17	µg/L	No
	RD-17	Dissolved	0.0011	mg/L	J/J	No	Yes	02/10/2014	SSFL Comparison	17	µg/L	No
	RD-33A	Total	0.003	mg/L		No	Yes	06/01/2016	SSFL Comparison	17	µg/L	No
	RD-96	Total	0.0026	mg/L		No	Yes	06/01/2017	SSFL Comparison	17	µg/L	No
Nitrate-NO3	DD-145	Total	4.2	mg/L		Yes	Yes		Cal MCL	45000	µg/L	No
	PZ-105	Total	4.4	mg/L		Yes	Yes		Cal MCL	45000	µg/L	No
Perchlorate	RD-33B	Total	0.017	µg/L	J/J	Yes	Yes		Cal MCL	6	µg/L	No
Potassium	DD-139	Dissolved	4.8	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
		Total	4.5	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	DD-142	Total	4.5	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	DS-43	Total	6.2	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	DS-44	Total	4.6	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	DS-46	Total	4.9	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	PZ-105	Total	6.4	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	PZ-108	Dissolved	7	mg/L		Yes	Yes		SSFL Comparison	9600	µg/L	No
		Total	7.6	mg/L		Yes	Yes		SSFL Comparison	9600	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	RD-34A	Dissolved	4.3	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
	RD-96	Total	5.1	mg/L		No	Yes	06/01/2017	SSFL Comparison	9600	µg/L	No
Radium-226	DD-141	Total	2.5	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	DS-44	Total	0.906	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	DS-47	Dissolved	0.464	pCi/L	/J	No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-33B	Total	0.512	pCi/L		Yes	Yes		Primary MCL	5	pCi/L	No
	RD-34A	Total	0.677	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	RD-34B	Total	0.235	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-96	Dissolved	1.11	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-98	Total	0.275	pCi/L		Yes	Yes		Primary MCL	5	pCi/L	No
Radium-228	DD-141	Total	4.22	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	DD-143	Dissolved	3.64	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	DS-44	Total	2.14	pCi/L	/J	No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	RD-14	Dissolved	1.25	pCi/L		No	Yes	10/31/1989	Primary MCL	5	pCi/L	No
		Total	1.31	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	RD-19	Dissolved	3.02	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-20	Dissolved	1.15	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
		Total	2.94	pCi/L		Yes	Yes		Primary MCL	5	pCi/L	No
	RD-33B	Total	2.92	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-33C	Total	4.55	pCi/L		No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
	RD-34B	Total	0.622	pCi/L		Yes	Yes		Primary MCL	5	pCi/L	No
	RD-63	Total	2.34	pCi/L		No	Yes	06/01/2016	Primary MCL	5	pCi/L	No
	RD-96	Dissolved	1.61	pCi/L	/J	No	Yes	06/01/2017	Primary MCL	5	pCi/L	No
Selenium	PZ-105	Total	0.0015	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	1.6	µg/L	No
Silver	DD-141	Dissolved	0.000033	mg/L	J/J	Yes	Yes		SSFL Comparison	0.17	µg/L	No
		Total	0.000064	mg/L	J/J	Yes	Yes		SSFL Comparison	0.17	µg/L	No
	DD-144	Dissolved	0.000039	mg/L	J/J	Yes	Yes		SSFL Comparison	0.17	µg/L	No
	PZ-108	Dissolved	0.000036	mg/L	J/J	Yes	Yes		SSFL Comparison	0.17	µg/L	No
	RD-54A	Total	0.000037	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	0.17	µg/L	No
	RD-96	Total	0.000075	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	0.17	µg/L	No
Sodium	DD-140	Dissolved	43	mg/L		No	Yes	06/01/2017	SSFL Comparison	190000	µg/L	No
		Total	46	mg/L		No	Yes	06/01/2017	SSFL Comparison	190000	µg/L	No
	DD-144	Total	71	mg/L		No	Yes	06/01/2017	SSFL Comparison	190000	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
	DS-43	Total	150	mg/L		No	Yes	06/01/2016	SSFL Comparison	190000	µg/L	No
	DS-47	Total	39	mg/L		No	Yes	06/01/2016	SSFL Comparison	190000	µg/L	No
	PZ-108	Dissolved	82	mg/L		No	Yes	06/01/2015	SSFL Comparison	190000	µg/L	No
		Total	81	mg/L	B/	No	Yes	06/01/2015	SSFL Comparison	190000	µg/L	No
	RD-17	Dissolved	41	mg/L		No	Yes	09/21/1989	SSFL Comparison	190000	µg/L	No
		Total	39	mg/L		Yes	Yes		SSFL Comparison	190000	µg/L	No
	RD-21	Total	83	mg/L	B/	No	Yes	06/01/2016	SSFL Comparison	190000	µg/L	No
	RD-33A	Total	48	mg/L		No	Yes	06/01/2016	SSFL Comparison	190000	µg/L	No
Sodium-22	RD-07	Dissolved	6.33	pCi/L		Yes	Yes		Primary MCL (a)	400	pCi/L	No
Strontium	DD-139	Dissolved	0.32	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.31	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DD-140	Dissolved	0.28	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.3	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DD-141	Dissolved	0.29	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DD-142	Total	0.3	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DD-143	Dissolved	0.35	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.33	mg/L		No	Yes	06/01/2016	SSFL Comparison	800	µg/L	No
	DD-144	Dissolved	0.26	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DS-43	Total	0.3	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DS-44	Total	0.29	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DS-46	Dissolved	0.34	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.39	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	DS-47	Dissolved	0.25	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.27	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	PZ-105	Total	0.49	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	PZ-108	Dissolved	0.34	mg/L		Yes	Yes		SSFL Comparison	800	µg/L	No
		Total	0.36	mg/L		Yes	Yes		SSFL Comparison	800	µg/L	No
	RD-07	Dissolved	0.24	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.24	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-17	Dissolved	0.36	mg/L		No	Yes	09/21/1989	SSFL Comparison	800	µg/L	No
		Total	0.36	mg/L		Yes	Yes		SSFL Comparison	800	µg/L	No
	RD-19	Total	0.45	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-21	Dissolved	0.29	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
		Total	0.29	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-33A	Total	0.38	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-33C	Dissolved	0.44	mg/L		No	Yes	10/01/1991	SSFL Comparison	800	µg/L	No
		Total	0.44	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-34A	Total	0.34	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-34B	Total	0.019	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-34C	Total	0.25	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-54A	Dissolved	0.32	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
		Total	0.32	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-59B	Dissolved	0.62	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
	RD-96	Total	0.29	mg/L		No	Yes	06/01/2017	SSFL Comparison	800	µg/L	No
Strontium-90	RD-33B	Dissolved	0.241	pCi/L		Yes	Yes		Primary MCL	8	pCi/L	No
	RD-34B	Dissolved	0.333	pCi/L		Yes	Yes		Primary MCL	8	pCi/L	No
Thallium	DD-141	Total	0.00011	mg/L	J/J	No	Yes	06/01/2017	SSFL Comparison	0.13	µg/L	No
	DD-142	Total	0.000058	mg/L	J/J	Yes	Yes		SSFL Comparison	0.13	µg/L	No
	DD-144	Dissolved	0.00016	mg/L	J/J	Yes	Yes		SSFL Comparison	0.13	µg/L	Yes
	DS-44	Dissolved	0.000093	mg/L	J/J	Yes	Yes		SSFL Comparison	0.13	µg/L	No
	DS-47	Dissolved	0.000073	mg/L	J/J	Yes	Yes		SSFL Comparison	0.13	µg/L	No
	RD-33A	Total	0.000068	mg/L	J/J	No	Yes	02/12/2014	SSFL Comparison	0.13	µg/L	No
Tin	RD-33A	Total	0.00078	mg/L	J/J	Yes	Yes		SSFL Comparison	2.4	µg/L	No
trans-1,2-Dichloroethene	RD-33A	Total	3.2	µg/L		No	Yes	06/01/2017	Cal MCL	10	µg/L	No
	RD-65	Total	24	µg/L		No	Yes	06/01/2017	Cal MCL	10	µg/L	Yes
Trichloroethene	C-8	Total	82	µg/L		No	Yes	06/01/2017	Primary MCL	5	µg/L	Yes
	DD-140	Total	0.91	µg/L	J/J	Yes	Yes		Primary MCL	5	µg/L	No
	DD-144	Total	200	µg/L		No	Yes	06/01/2016	Primary MCL	5	µg/L	Yes
	RD-23	Total	1100	µg/L		No	Yes	07/16/2009	Primary MCL	5	µg/L	Yes
Uranium-233/234	DD-141	Dissolved	1.77	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	2.22	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	DD-143	Dissolved	2.7	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	2.57	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	DS-44	Dissolved	2.99	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	3.25	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	DS-47	Dissolved	1.67	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
		Total	2.49	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	PZ-120	Total	2.82	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-19	Dissolved	15.9	pCi/L		No	Yes	07/18/2011	Cal MCL	20	pCi/L	No
		Total	16.7	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-20	Total	4.54	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	RD-33A	Total	2.35	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	RD-33C	Dissolved	0.264	pCi/L		No	Yes	09/03/2010	Cal MCL	20	pCi/L	No
		Total	0.157	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	RD-54A	Total	2.95	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	RD-59A	Dissolved	2.12	pCi/L		No	Yes	07/11/2011	Cal MCL	20	pCi/L	No
		Total	1.72	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-59B	Total	0.278	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-59C	Total	0.214	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-63	Total	4.4	pCi/L	F/	Yes	Yes		Cal MCL	20	pCi/L	No
	RD-96	Total	6.49	pCi/L	F/	No	Yes	05/09/2006	Cal MCL	20	pCi/L	No
	RD-98	Total	4.03	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
Uranium-235/236	DD-141	Total	0.271	pCi/L		Yes	Yes					
	DD-143	Dissolved	0.0849	pCi/L		Yes	Yes					
	DS-44	Dissolved	0.174	pCi/L		Yes	Yes					
	RD-07	Total	0.301	pCi/L		Yes	Yes					
	RD-19	Total	0.761	pCi/L		Yes	Yes					
	RD-20	Total	0.137	pCi/L		Yes	Yes					
	RD-33A	Total	0.125	pCi/L		Yes	Yes					
	RD-34A	Total	0.416	pCi/L		Yes	Yes					
	RD-54A	Total	0.161	pCi/L		Yes	Yes					
	RD-63	Total	0.252	pCi/L		Yes	Yes					
	RD-96	Total	0.323	pCi/L		Yes	Yes					
	RD-98	Dissolved	0.274	pCi/L		No	Yes	04/19/2011				
		Total	0.13	pCi/L		Yes	Yes					
Uranium-238	PZ-120	Total	2.38	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-07	Dissolved	2.36	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	2.96	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-14	Dissolved	1.83	pCi/L		No	Yes	06/01/2017	Cal MCL	20	pCi/L	No

TABLE 9
FIRST-TIME DETECTS AND NEW MAXIMUM CONCENTRATIONS, 2018 – AREA IV

Analyte	Well ID	Fraction	2018 Results	Units	Qualifiers	New Detection	New Max Detect	Date of Previous Max Detect	Screening Type	Screening Value	Screening Unit	2018 Result Greater Than Screening Value
		Total	1.41	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-20	Dissolved	3.57	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	3.24	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-33A	Dissolved	1.63	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-34A	Dissolved	5.55	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	5.74	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-54A	Dissolved	2.3	pCi/L		No	Yes	06/01/2017	Cal MCL	20	pCi/L	No
		Total	2.84	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-59A	Total	1.41	pCi/L		No	Yes	06/01/2017	Cal MCL	20	pCi/L	No
	RD-63	Dissolved	4	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	5.34	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
	RD-96	Dissolved	5.34	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
		Total	4.99	pCi/L		No	Yes	06/01/2017	Cal MCL	20	pCi/L	No
	RD-98	Dissolved	2.37	pCi/L		Yes	Yes		Cal MCL	20	pCi/L	No
Vanadium	DD-141	Total	0.0071	mg/L		No	Yes	06/01/2017	SSFL Comparison	2.6	µg/L	Yes
	DD-142	Total	0.0052	mg/L		No	Yes	06/01/2016	SSFL Comparison	2.6	µg/L	Yes
	PZ-120	Total	0.0069	mg/L		No	Yes	02/11/2014	SSFL Comparison	2.6	µg/L	Yes
Zinc	DD-142	Total	0.013	mg/L	B/	No	Yes	06/01/2016	SSFL Comparison	6300	µg/L	No
	DD-144	Dissolved	0.003	mg/L	J/J	No	Yes	06/01/2016	SSFL Comparison	6300	µg/L	No
	DS-43	Dissolved	0.0024	mg/L	J/J	Yes	Yes		SSFL Comparison	6300	µg/L	No
	PZ-105	Total	0.013	mg/L		No	Yes	06/01/2017	SSFL Comparison	6300	µg/L	No
	PZ-120	Dissolved	0.066	mg/L		No	Yes	06/01/2017	SSFL Comparison	6300	µg/L	No
		Total	0.35	mg/L		No	Yes	06/01/2017	SSFL Comparison	6300	µg/L	No
	RD-17	Dissolved	1.4	mg/L		No	Yes	02/10/2014	SSFL Comparison	6300	µg/L	No
		Total	1.8	mg/L		No	Yes	02/10/2014	SSFL Comparison	6300	µg/L	No
	RD-34B	Total	0.13	mg/L		No	Yes	06/01/2015	SSFL Comparison	6300	µg/L	No
	RD-54A	Total	0.53	mg/L		No	Yes	06/01/2017	SSFL Comparison	6300	µg/L	No

Notes:
/ separates lab qualifiers from data validation flags.
B = Compound was found in the blank and sample.
J = Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.
F = MS/MSD Recovery and/or RPD exceeds the control limits.
F1 = MS and/or MSD recover is outside acceptance limits.
^ = Instrument related QC is outside acceptance limits.
G = The sample MDC is greater than the requested RL.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	C-8	DD-139	DD-139	DD-140	DD-140	DD-141
			Sample Name	C-8_021918_01_L	DD-139_022218_01_L	DD-139_022218_36_L	DD-140_022718_01_L	DD-140_022718_36_L	DD-141_022718_01_L
			Sample Date	2/19/2018	2/22/2018	2/22/2018	2/27/2018	2/27/2018	2/27/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	N	FD	N	FD	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	12 U / U	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	4 U / UJ	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	----	----	----	0.9 J / J	----	1 U / U
2-Butanone (MEK)	N	SW8260B	µg/L	24 U / U	6 U / U	4.7 J / J	6 U / U	6 U / U	6 U / U
Acetone	N	SW8260B	µg/L	40 U / U	7 JB / U	9.1 JB / U	10 U / U	10 U / U	10 U / U
Benzene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / UJ	1 U / UJ	1 U / UJ
Chloroform	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	4.8	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Ethylbenzene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	8 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Toluene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	82	1 U / U	1 U / U	0.91 J / J	0.88 J / J	1 U / U
Trichlorofluoromethane	N	SW8260B	µg/L	8 U / UJ	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	4 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	8 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	DD-142	DD-143	DD-144	DD-145	DS-43	DS-44
			Sample Name	DD-142_022218_01_L	DD-143_022618_01_L	DD-144_022218_01_L	DD-145_021918_01_L	DS-43_022218_01_L	DS-44_022318_01_L
			Sample Date	2/22/2018	2/26/2018	2/22/2018	2/19/2018	2/22/2018	2/23/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	3 U / U	3 U / U	7.8 J / J	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / UJ	1 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	----	----	----	----	----	----
2-Butanone (MEK)	N	SW8260B	µg/L	6 U / U	6 U / U	24 U / U	6 U / U	6 U / U	6 U / U
Acetone	N	SW8260B	µg/L	3.6 JB / U	10 U / U	40 U / U	10 U / U	10 B / U	10 U / U
Benzene	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
Chloroform	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	16	1 U / U	1 U / U	1 U / U
Ethylbenzene	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	2 U / U	2 U / U	8 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	3.6	1 U / U	4 U / U	1 U / U	0.25 J / J	1 U / U
Toluene	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	200	0.33 J / J	1 U / U	1 U / U
Trichlorofluoromethane	N	SW8260B	µg/L	2 U / U	2 U / U	8 U / U	2 U / UJ	2 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	1 U / U	1 U / U	4 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	2 U / U	2 U / U	8 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
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TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	DS-46	DS-47	PZ-105	PZ-108	PZ-109	PZ-120
			Sample Name	DS-46_022718_01_L	DS-47_022318_01_L	PZ-105_021918_01_L	PZ-108_021918_01_L	PZ-109_022218_01_L	PZ-120_022618_01_L
			Sample Date	2/27/2018	2/23/2018	2/19/2018	2/19/2018	2/22/2018	2/26/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	3 U / U	3 U / U	3 U / U	30 U / U	12 U / U	0.5 J / J
1,1,2-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / UJ	10 U / UJ	4 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	1.5	----	----	----	----	----
2-Butanone (MEK)	N	SW8260B	µg/L	6 U / U	6 U / U	6 U / U	60 U / U	24 U / U	6 U / U
Acetone	N	SW8260B	µg/L	10 U / U	10 U / U	10 U / U	100 U / U	17 JB / U	10 U / U
Benzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	1 UF1 / UJ	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
Chloroform	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	12	1.9 J / J	1 U / U
Ethylbenzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	20 U / U	8 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	72	1 U / U
Toluene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	0.43 J / J	1 U / U	11	160	6.1	5.6
Trichlorofluoromethane	N	SW8260B	µg/L	2 UF1 / U	2 U / U	2 U / UJ	20 U / UJ	8 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	10 U / U	4 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	20 U / U	8 U / U	2 U / U

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TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	RD-07	RD-14	RD-17	RD-19	RD-20	RD-21
			Sample Name	RD-07_022618_01_L	RD-14_030218_01_L	RD-17_030218_01_L	RD-19_022818_01_L	RD-20_022018_01_L	RD-21_022018_01_L
			Sample Date	2/26/2018	3/2/2018	3/2/2018	2/28/2018	2/20/2018	2/20/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / UJ	1 U / UJ
1,4-Dioxane	N	SW8260B	µg/L	----	----	----	----	----	----
2-Butanone (MEK)	N	SW8260B	µg/L	6 U / U	6 U / U	6 U / U	6 U / U	6 U / U	6 U / U
Acetone	N	SW8260B	µg/L	10 U / U	5.4 J / U	11 U	5 J / J	10 U / U	10 U / U
Benzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	11
Chloroform	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	3.7
cis-1,2-Dichloroethene	N	SW8260B	µg/L	2.2	1 U / U	1 U / U	1 U / U	1 U / U	1.7
Ethylbenzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Toluene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	32	0.22 J / J	0.27 J / J	1 U / U	1 U / U	45 J
Trichlorofluoromethane	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / UJ	2 U / UJ
Vinyl chloride	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	RD-23	RD-29	RD-33A	RD-33B	RD-33C	RD-34A
			Sample Name	RD-23_021918_01_L	RD-29_022718_01_L	RD-33A_030118_01_L	RD-33B_022018_01_L	RD-33C_022118_01_L	RD-34A_030218_01_L
			Sample Date	2/19/2018	2/27/2018	3/1/2018	2/20/2018	2/21/2018	3/2/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	120 U / U	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	40 U / U	1 U / U	0.41 J / J	1 U / U	1 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	30 J / J	1 U / U	0.54 J / J	1 U / U	1 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	----	----	----	----	----	1 U / UJ
2-Butanone (MEK)	N	SW8260B	µg/L	240 U / U	6 U / U	6 U / U	6 U / UJ	6 U / UJ	6 U / U
Acetone	N	SW8260B	µg/L	400 U / U	10 U / U	5 J / U	10 U / UJ	10 U / UJ	9.1 J / U
Benzene	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	40 U / U	1 U / UJ	1 U / U	1 U / U	1 U / U	1 U / U
Chloroform	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	28 J / J	1 U / U	2.1	1 U / U	1 U / U	0.44 J / J
Ethylbenzene	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	80 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Toluene	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	40 U / U	1 U / U	3.2	1 U / U	1 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	1100	1.1	1	1 U / U	1 U / U	0.78 J / J
Trichlorofluoromethane	N	SW8260B	µg/L	80 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	40 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	80 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	RD-34A	RD-34B	RD-34C	RD-54A	RD-59A	RD-59B
			Sample Name	RD-34A_030218_36_L	RD-34B_030118_01_L	RD-34C_030218_01_L	RD-54A_030118_01_L	RD-59A_022818_01_L	RD-59B_022818_01_L
			Sample Date	3/2/2018	3/1/2018	3/2/2018	3/1/2018	2/28/2018	2/28/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	FD	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	----	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	0.22 J / J	0.48 J / J	1 U / UJ	----	----	----
2-Butanone (MEK)	N	SW8260B	µg/L	----	6 U / U	6 U / U	6 U / U	6 U / U	6 U / U
Acetone	N	SW8260B	µg/L	----	9.1 J / U	6.8 J / U	2 J / U	8.2 J / J	10 U / U
Benzene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Chloroform	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1.8	1 U / U	1 U / U
Ethylbenzene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	----	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Toluene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Trichloroethene	N	SW8260B	µg/L	----	1 U / U	1 U / U	2.3	1 U / U	1 U / U
Trichlorofluoromethane	N	SW8260B	µg/L	----	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	----	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	----	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	RD-59C	RD-59C	RD-63	RD-63	RD-65	RD-96
			Sample Name	RD-59C_022818_01_L	RD-59C_022818_36_L	RD-63_022118_01_L	RD-63_022118_36_L	RD-65_022718_01_L	RD-96_022118_01_L
			Sample Date	2/28/2018	2/28/2018	2/21/2018	2/21/2018	2/27/2018	2/21/2018
			Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
			Sample Type	N	FD	N	FD	N	N
Analyte	**Fraction**	**Method**	**Units**						
1,1,1-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U	3 U / U
1,1,2-Trichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,1-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	0.61 J / J	0.6 J / J	2.3	1 U / U
1,1-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	0.77 J / J	0.77 J / J	7.7	1 U / U
1,2-Dichloroethane	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
1,4-Dioxane	N	SW8260B	µg/L	----	----	----	----	0.5 J / J	----
2-Butanone (MEK)	N	SW8260B	µg/L	6 U / U	6 U / U	6 U / UJ	6 U / UJ	6 U / U	6 U / UJ
Acetone	N	SW8260B	µg/L	3.7 J / J	4.5 J / J	10 U / UJ	10 U / UJ	10 U / U	10 U / UJ
Benzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Carbon Tetrachloride	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Chloroform	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	4.3	4.1	9.7	1 U / U
Ethylbenzene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Methylene Chloride	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Tetrachloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Toluene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	24	1 U / U
Trichloroethene	N	SW8260B	µg/L	1 U / U	1 U / U	6	6 U	10	1 U / U
Trichlorofluoromethane	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U
Vinyl chloride	N	SW8260B	µg/L	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U	1 U / U
Xylenes, Total	N	SW8260B	µg/L	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U	2 U / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 10
VOLATILE ORGANIC COMPOUNDS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CA

			Well Identifier	RD-98	RS-18*
			Sample Name	RD-98_022818_01_L	RS-18_060718_01_L
			Sample Date	2/28/2018	6/7/2018
			Lab Name	TA-DEN	EMAX
			Sample Type	N	N
Analyte	**Fraction**	**Method**	**Units**		
1,1,1-Trichloroethane	N	SW8260B	µg/L	1 U / U	0.2 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	N	SW8260B	µg/L	3 U / U	0.3 U
1,1,2-Trichloroethane	N	SW8260B	µg/L	1 U / U	0.2 U
1,1-Dichloroethane	N	SW8260B	µg/L	1 U / U	0.2 U
1,1-Dichloroethene	N	SW8260B	µg/L	1 U / U	0.2 U
1,2-Dichloroethane	N	SW8260B	µg/L	1 U / U	0.2 U
1,4-Dioxane	N	SW8260B	µg/L	----	----
2-Butanone (MEK)	N	SW8260B	µg/L	6 U / U	----
Acetone	N	SW8260B	µg/L	8.7 J / J	5 U
Benzene	N	SW8260B	µg/L	1 U / U	0.2 U
Carbon Tetrachloride	N	SW8260B	µg/L	1 U / U	0.2 U
Chloroform	N	SW8260B	µg/L	1 U / U	0.2 U
cis-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	0.2 U
Ethylbenzene	N	SW8260B	µg/L	1 U / U	0.2 U
Methylene Chloride	N	SW8260B	µg/L	2 U / U	0.5 U
Tetrachloroethene	N	SW8260B	µg/L	1 U / U	0.2 U
Toluene	N	SW8260B	µg/L	1 U / U	0.2 U
trans-1,2-Dichloroethene	N	SW8260B	µg/L	1 U / U	0.2 U
Trichloroethene	N	SW8260B	µg/L	1.4	4.8
Trichlorofluoromethane	N	SW8260B	µg/L	2 U / U	0.3 U
Vinyl chloride	N	SW8260B	µg/L	1 U / U	0.2 U
Xylenes, Total	N	SW8260B	µg/L	2 U / U	----

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
* - Data for RS-18 was provided by CDM Smith (CDM Smith 2018d)
EMAX – EMAX Laboratories, Inc.
LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 11
PERCHLORATE ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

			Well Identifier	DD-139	DD-141	RD-21	RD-33A	RD-33B
			Sample Name	DD-139_022218_01_L	DD-141_022718_01_L	RD-21_022018_01_L	RD-33A_030118_01_L	RD-33B_022018_01_L
			Sample Date	2/22/2018	2/27/2018	2/20/2018	3/1/2018	2/20/2018
			Lab Name	TA DEN	TA DEN	TA DEN	TA DEN	TA DEN
			Sample Type	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Perchlorate	N	SW6860	µg/L	0.057	0.05 U* / U	2.3 / J-	0.05 U* / U	0.017 J / J

			Well Identifier	RD-33B	RD-33C	RD-54A	RD-59A	RD-59B
			Sample Name	RD-33B_022018_36_L	RD-33C_022118_01_L	RD-54A_030118_01_L	RD-59A_022818_01_L	RD-59B_022818_01_L
			Sample Date	2/20/2018	2/21/2018	3/1/2018	2/28/2018	2/28/2018
			Lab Name	TA DEN	TA DEN	TA DEN	TA DEN	TA DEN
			Sample Type	FD	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Perchlorate	N	SW6860	µg/L	0.011 J / J	0.05 U* / U	0.05 U* / U	0.05 U* / U	0.05 U* / U

			Well Identifier	RD-59C	RD-96
			Sample Name	RD-59C_022818_01_L	RD-96_022118_01_L
			Sample Date	2/28/2018	2/21/2018
			Lab Name	TA DEN	TA DEN
			Sample Type	N	N
Analyte	**Fraction**	**Method**	**Units**		
Perchlorate	N	SW6860	µg/L	0.05 U* / U	0.05 U* / U

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado

LAB / VALIDATION FLAGS
* - RPD of the LCS and LCSD exceeds the control limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 12
FUEL HYDROCARBONS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

			Well Identifier	DD-141	DD-145	DD-145	PZ-105	RD-14
			Sample Name	DD-141_022718_01_L	DD-145_021918_01_L	DD-145_021918_36_L	PZ-105_021918_01_L	RD-14_030218_01_L
			Sample Date	2/27/2018	2/19/2018	2/19/2018	2/19/2018	3/2/2018
			Lab Name	TA DEN	TA DEN	TA DEN	TA DEN	TA DEN
			Sample Type	N	N	FD	N	N
Analyte	**Fraction**	**Method**	**Units**					
Diesel Range Organics (DRO) [C10-C28]	N	SW8015DRO	µg/L	62 JB / U	56 J / J	----	520	43 J / J
Gasoline Range Organics (GRO) [C6-C10[	N	SW8015GRO	µg/L	55 F1 / J	25 U / U	25 U / U	11 J / J	25 U / U

			Well Identifier	RD-19	RD-34A	RD-54A	RD-63	RD-63
			Sample Name	RD-19_022818_01_L	RD-34A_030218_01_L	RD-54A_030118_01_L	RD-63_022118_01_L	RD-63_022118_36_L
			Sample Date	2/28/2018	3/2/2018	3/1/2018	2/21/2018	2/21/2018
			Lab Name	TA DEN	TA DEN	TA DEN	TA DEN	TA DEN
			Sample Type	N	N	N	N	FD
Analyte	**Fraction**	**Method**	**Units**					
Diesel Range Organics (DRO) [C10-C28]	N	SW8015DRO	µg/L	58 JB / U	55 J / J	58 J / J	46 J / J	----
Gasoline Range Organics (GRO) [C6-C10[	N	SW8015GRO	µg/L	29 U	25 U / U	57 J	17 J / J	17 J / U

TABLE 12
FUEL HYDROCARBONS ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

			Well Identifier	RD-96	RD-96
			Sample Name	RD-96_022118_01_L	RD-96_022118_36_L
			Sample Date	2/21/2018	2/21/2018
			Lab Name	TA DEN	TA DEN
			Sample Type	N	FD
Analyte	**Fraction**	**Method**	**Units**		
Diesel Range Organics (DRO) [C10-C28]	N	SW8015DRO	µg/L	51 J / J	44 J / J
Gasoline Range Organics (GRO) [C6-C10[	N	SW8015GRO	µg/L	10 J / U	----

NOTES AND ABBREVIATIONS
µg/L - micrograms per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado

LAB / VALIDATION QUALIFIERS
B - Compound was found in the blank and sample.
F1 - MS and/or MSD Recovery is outside acceptance limits.
U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit.
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 13
INORGANIC ANALYTES ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

			Well Identifier	DD-145	PZ-105	RD-14	RD-19
			Sample Name	DD-145_021918_01_L	PZ-105_021918_01_L	RD-14_030218_01_L	RD-19_022818_01_L
			Sample Date	2/19/2018	2/19/2018	3/2/2018	2/28/2018
			Lab Name	TA STL	TA STL	TA DEN	TA DEN
			Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**				
Fluoride	T	E300.0	mg/L	----	----	0.27 J / J	0.41 J / J
Nitrate as N	T	E300.0	mg/L	4.2	4.4	----	----

			Well Identifier	RD-20	RD-20	RD-34A	RD-34B
			Sample Name	RD-20_022018_01_L	RD-20_022018_36_L	RD-34A_030218_01_L	RD-34B_030118_01_L
			Sample Date	2/20/2018	2/20/2018	3/2/2018	3/1/2018
			Lab Name	TA DEN	TA DEN	TA DEN	TA DEN
			Sample Type	N	FD	N	N
Analyte	**Fraction**	**Method**	**Units**				
Fluoride	T	E300.0	mg/L	----	----	0.45 J / J	0.69
Nitrate as N	T	E300.0	mg/L	9.4	9.4	----	----

			Well Identifier	RD-34C	RD-59A	RD-59B
			Sample Name	RD-34C_030218_01_L	RD-59A_022818_01_L	RD-59B_022818_01_L
			Sample Date	3/2/2018	2/28/2018	2/28/2018
			Lab Name	TA DEN	TA DEN	TA DEN
			Sample Type	N	N	N
Analyte	**Fraction**	**Method**	**Units**			
Fluoride	T	E300.0	mg/L	0.33 J / J	0.89	0.8
Nitrate as N	T	E300.0	mg/L	----	----	----

			Well Identifier	RD-59B	RD-59C
			Sample Name	RD-59B_022818_36_L	RD-59C_022818_01_L
			Sample Date	2/28/2018	2/28/2018
			Lab Name	TA DEN	TA DEN
			Sample Type	FD	N
Analyte	**Fraction**	**Method**	**Units**		
Fluoride	T	E300.0	mg/L	0.8	0.71
Nitrate as N	T	E300.0	mg/L	----	----

TABLE 13
INORGANIC ANALYTES ANALYTICAL RESULTS, 2018 – AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

NOTES AND ABBREVIATIONS
mg/L - milligrams per liter
---- - Not analyzed
N - Normal Sample
FD - Field Duplicate Sample
TA DEN - Test America Denver, Colorado
TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS
J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

			Well Identifier	DD-141	DD-143	DD-144	DS-44
			Sample Name	DD-141_022718_01_L	DD-143_022618_01_L	DD-144_022218_01_L	DS-44_022318_01_L
			Sample Date	2/27/2018	2/26/2018	2/22/2018	2/23/2018
			Lab Name	TA STL	TA STL	TA STL	TA STL
			Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**				
Actinium-228	T	E901.1	pCi/L	9.02 U / U	14.9 U / U	----	22.8 U / U
Actinium-228	D	E901.1	pCi/L	1.59 U / U	0.0191 U / U	----	16.4 U / U
Americium-241	T	E901.1	pCi/L	-8.13 U / U	-7.16 U / U	----	-0.887 U / U
Americium-241	D	E901.1	pCi/L	-3.09 U / U	5.48 U / U	----	-10.0 U / U
Antimony-125	T	E901.1	pCi/L	4.24 U / U	7.47 U / U	----	2.79 U / U
Antimony-125	D	E901.1	pCi/L	13.9 U / U	-2.48 U / U	----	13.2 U / U
Barium-133	T	E901.1	pCi/L	-1.81 U / U	9.23 U / U	----	0.287 U / U
Barium-133	D	E901.1	pCi/L	-3.29 U / U	-0.741 U / U	----	12.1 U / U
Cesium-134	T	E901.1	pCi/L	0.136 U / U	7.2 U / U	----	7.62 U / U
Cesium-134	D	E901.1	pCi/L	8.05 U / U	-1.77 U / U	----	9.48 U / U
Cesium-137	T	E901.1	pCi/L	-3.73 U / U	-7.48 U / U	----	-9.72 U / U
Cesium-137	D	E901.1	pCi/L	-4.52 U / U	-2.49 U / U	----	-3.22 U / U
Cobalt-57	T	E901.1	pCi/L	-0.0564 U / U	1.07 U / U	----	-0.498 U / U
Cobalt-57	D	E901.1	pCi/L	-1.04 U / U	4.37 U / U	----	-3.69 U / U
Cobalt-60	T	E901.1	pCi/L	-5.84 U / U	-10.7 U / U	----	-0.440 U / U
Cobalt-60	D	E901.1	pCi/L	0.398 U / U	-0.497 U / U	----	2.36 U / U
Europium-152	T	E901.1	pCi/L	8.58 U / U	2.86 U / U	----	1.07 U / U
Europium-152	D	E901.1	pCi/L	12.9 U / U	17.5 U / U	----	14.3 U / U
Europium-154	T	E901.1	pCi/L	11.7 U / U	-52.1 U / U	----	-32.0 U / U
Europium-154	D	E901.1	pCi/L	-0.0963 U / U	10.7 U / U	----	35.8 U / U
Europium-155	T	E901.1	pCi/L	-4.79 U / U	-0.477 U / U	----	-4.52 U / U
Europium-155	D	E901.1	pCi/L	-7.36 U / U	-0.566 U / U	----	-10.6 U / U
Gross Alpha	T	E900	pCi/L	19 G /	7.04 G /	----	7.83 G /
Gross Alpha	D	E900	pCi/L	4.91 G /	2.55 UG / U	----	5.22 G /
Gross Beta	T	E900	pCi/L	18.9	8.93	----	11.9
Gross Beta	D	E900	pCi/L	5.25	7.7	----	3.93
Manganese-54	T	E901.1	pCi/L	2.54 U / U	-1.35 U / U	----	6.24 U / U
Manganese-54	D	E901.1	pCi/L	0.13 U / U	3.52 U / U	----	-9.86 U / U
Potassium-40	T	E901.1	pCi/L	0.986 U / U	50.3 U / U	----	-101 U / U
Potassium-40	D	E901.1	pCi/L	-40.5 U / U	-69.3 U / U	----	23.0 U / U
Radium-226	T	E903	pCi/L	2.5	1.67	----	0.906
Radium-226	D	E903	pCi/L	1.39	1.46	----	0.311 / UJ
Radium-228	T	E904	pCi/L	4.22	3.33	----	2.14 / J
Radium-228	D	E904	pCi/L	2.06	3.64	----	0.831 / UJ
Sodium-22	T	E901.1	pCi/L	2.34 U / U	3.75 U / U	----	-7.75 U / U
Sodium-22	D	E901.1	pCi/L	-3.73 U / U	4.45 U / U	----	-0.372 U / U
Strontium-90	T	E905	pCi/L	0.0718 U / U	0.0613 U / U	----	0.123 U / U
Strontium-90	D	E905	pCi/L	0.183 U / U	0.179 U / U	----	0.0966 U / U
Tritium	T	E906.0	pCi/L	----	----	-29.3 U / U	----
Uranium-233/234	T	A-01-R	pCi/L	2.22	2.57	----	3.25 F /
Uranium-233/234	D	A-01-R	pCi/L	1.77	2.7	----	2.99
Uranium-235/236	T	A-01-R	pCi/L	0.271	0.0572 U / U	----	0.180 U / U
Uranium-235/236	D	A-01-R	pCi/L	0.0257 U / U	0.0849	----	0.174
Uranium-238	T	A-01-R	pCi/L	1.33	1.9	----	2.51
Uranium-238	D	A-01-R	pCi/L	1.34	1.47	----	2.72

NOTES AND ABBREVIATIONS

pCi/L - picocuries per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS

F - MS/MSD Recovery and/or RPD exceeds the control limits.

G - The Sample MDC is greater than the requested RL.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

		Well Identifier		DS-47	DS-47	PZ-120	RD-07
		Sample Name		DS-47_022318_01_L	DS-47_022318_36_L	PZ-120_022618_01_L	RD-07_022618_01_L
		Sample Date		2/23/2018	2/23/2018	2/26/2018	2/26/2018
		Lab Name		TA STL	TA STL	TA STL	TA STL
		Sample Type		N	FD	N	N
Analyte	**Fraction**	**Method**	**Units**				
Actinium-228	T	E901.1	pCi/L	-31.3 U / U	25.4 U / U	30.7 U / U	-25.6 U / U
Actinium-228	D	E901.1	pCi/L	18.3 U / U	16.8 U / U	----	19 U / U
Americium-241	T	E901.1	pCi/L	2.10 U / U	7.50 U / U	-7.87 U / U	2.41 U / U
Americium-241	D	E901.1	pCi/L	-11.7 U / U	3.39 U / U	----	-6.08 U / U
Antimony-125	T	E901.1	pCi/L	13.5 U / U	-3.13 U / U	4.97 U / U	15.5 U / U
Antimony-125	D	E901.1	pCi/L	-1.70 U / U	2.58 U / U	----	-4.71 U / U
Barium-133	T	E901.1	pCi/L	-5.63 U / U	6.93 U / U	12.2 U / U	-1.37 U / U
Barium-133	D	E901.1	pCi/L	6.64 U / U	5.98 U / U	----	-1.06 U / U
Cesium-134	T	E901.1	pCi/L	9.57 U / U	1.85 U / U	0.0978 U / U	0.386 U / U
Cesium-134	D	E901.1	pCi/L	0.672 U / U	3.50 U / U	----	1.56 U / U
Cesium-137	T	E901.1	pCi/L	3.28 U / U	-0.336 U / U	-2.43 U / U	-1.19 U / U
Cesium-137	D	E901.1	pCi/L	3.90 U / U	-7.13 U / U	----	1.46 U / U
Cobalt-57	T	E901.1	pCi/L	-0.560 U / U	2.74 U / U	-1.37 U / U	0.796 U / U
Cobalt-57	D	E901.1	pCi/L	5.52	0.226 U / U	----	-3.11 U / U
Cobalt-60	T	E901.1	pCi/L	-5.45 U / U	-1.58 U / U	7.26	5.16 U / U
Cobalt-60	D	E901.1	pCi/L	-0.658 U / U	3.41 U / U	----	1.11 U / U
Europium-152	T	E901.1	pCi/L	-13.6 U / U	5.10 U / U	6.73 U / U	-7.65 U / U
Europium-152	D	E901.1	pCi/L	7.65 U / U	10.3 U / U	----	0.636 U / U
Europium-154	T	E901.1	pCi/L	31.3 U / U	-46.1 U / U	-42.5 U / U	10.7 U / U
Europium-154	D	E901.1	pCi/L	-10.7 U / U	44.5	----	13 U / U
Europium-155	T	E901.1	pCi/L	-14.5 U / U	-6.84 U / U	-2.2 U / U	-6.6 U / U
Europium-155	D	E901.1	pCi/L	-14.1 U / U	-5.65 U / U	----	3.62 U / U
Gross Alpha	T	E900	pCi/L	6.37 G /	3.21	2.89 UG / U	4.06 UG / U
Gross Alpha	D	E900	pCi/L	4.96 G /	3.16 G /	7.47 G /	5.46 G /
Gross Beta	T	E900	pCi/L	7.6	6.53	5.48	7.29
Gross Beta	D	E900	pCi/L	4.87	3.83	1.62 U / U	2.78
Manganese-54	T	E901.1	pCi/L	4.41 U / U	-0.507 U / U	-2.48 U / U	3.6 U / U
Manganese-54	D	E901.1	pCi/L	-7.64 U / U	-3.55 U / U	----	-0.00493 U / U
Potassium-40	T	E901.1	pCi/L	-67.7 U / U	2.96 U / U	28.1 U / U	-69.3 U / U
Potassium-40	D	E901.1	pCi/L	-54.4 U / U	-61.4 U / U	----	42.9 U / U
Radium-226	T	E903	pCi/L	0.383	0.408	0.14	0.33
Radium-226	D	E903	pCi/L	0.464 / J	0.324 / UJ	----	0.365
Radium-228	T	E904	pCi/L	0.853 / UJ	0.895 / UJ	0.79 / UJ	0.869 / J
Radium-228	D	E904	pCi/L	1.20 / UJ	1.28 / UJ	----	0.576
Sodium-22	T	E901.1	pCi/L	-3.14 U / U	0.000 U / U	4.5 U / U	5.45 U / U
Sodium-22	D	E901.1	pCi/L	1.05 U / U	-4.22 U / U	----	6.33
Strontium-90	T	E905	pCi/L	0.206 U / U	0.0406 U / U	0.0329 U / U	-0.0254 U / U
Strontium-90	D	E905	pCi/L	0.0466 U / U	0.0183 U / U	----	-0.0211 U / U
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	2.49 F /	1.84 F /	2.82	3.1
Uranium-233/234	D	A-01-R	pCi/L	1.67	1.79	----	2.79
Uranium-235/236	T	A-01-R	pCi/L	0.0417 U / U	0.195	0.141 U / U	0.301
Uranium-235/236	D	A-01-R	pCi/L	0.0625 U / U	0.0954 U / U	----	0.219
Uranium-238	T	A-01-R	pCi/L	1.79	1.58	2.38	2.96
Uranium-238	D	A-01-R	pCi/L	1.5	1.48	----	2.36

NOTES AND ABBREVIATIONS

pCi/L - picocuries per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS

F - MS/MSD Recovery and/or RPD exceeds the control limits.

G - The Sample MDC is greater than the requested RL.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

			Well Identifier	RD-14	RD-19	RD-20	RD-33A
			Sample Name	RD-14_030218_01_L	RD-19_022818_01_L	RD-20_022018_01_L	RD-33A_030118_01_L
			Sample Date	3/2/2018	2/28/2018	2/20/2018	3/1/2018
			Lab Name	TA STL	TA STL	TA STL	TA STL
			Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**				
Actinium-228	T	E901.1	pCi/L	24 U / U	20.4 U / U	36.6	-20.2 U / U
Actinium-228	D	E901.1	pCi/L	1.5 U / U	22.2 U / U	18.8 U / U	30.5 U / U
Americium-241	T	E901.1	pCi/L	5.92 U / U	9.67 U / U	10.7 U / U	-6.82 U / U
Americium-241	D	E901.1	pCi/L	10.5 U / U	6.82 U / U	1.72 U / U	-9.31 U / U
Antimony-125	T	E901.1	pCi/L	2.45 U / U	10.5 U / U	18.5 U / U	17.7 U / U
Antimony-125	D	E901.1	pCi/L	1.62 U / U	-2.49 U / U	3.28 U / U	-13.6 U / U
Barium-133	T	E901.1	pCi/L	-3.18 U / U	-3.14 U / U	1.95 U / U	0.675 U / U
Barium-133	D	E901.1	pCi/L	-2.56 U / U	-1.41 U / U	-1.22 U / U	14.1 U / U
Cesium-134	T	E901.1	pCi/L	2.58 U / U	-2.25 U / U	-3.07 U / U	6.51 U / U
Cesium-134	D	E901.1	pCi/L	13.1 U / U	-3 U / U	-1.76 U / U	10.5 U / U
Cesium-137	T	E901.1	pCi/L	-0.325 U / U	0.248 U / U	-3.78 U / U	-6.73 U / U
Cesium-137	D	E901.1	pCi/L	3.96 U / U	-2.06 U / U	1.39 U / U	5.37 U / U
Cobalt-57	T	E901.1	pCi/L	-1.07 U / U	3.29 U / U	2.78 U / U	3.95 U / U
Cobalt-57	D	E901.1	pCi/L	-1.88 U / U	7.38	2.92 U / U	-4.15 U / U
Cobalt-60	T	E901.1	pCi/L	-1.22 U / U	2.15 U / U	-7.95 U / U	0.36 U / U
Cobalt-60	D	E901.1	pCi/L	6.09 U / U	4.75 U / U	3.44 U / U	2.22 U / U
Europium-152	T	E901.1	pCi/L	-12.6 U / U	6.13 U / U	8.22 U / U	4.03 U / U
Europium-152	D	E901.1	pCi/L	-20.2 U / U	10.2 U / U	14.3 U / U	1.66 U / U
Europium-154	T	E901.1	pCi/L	12.7 U / U	15.4 U / U	0.000 U / U	-15.4 U / U
Europium-154	D	E901.1	pCi/L	-56.2 U / U	3.11 U / U	5.30 U / U	31.7 U / U
Europium-155	T	E901.1	pCi/L	-13.2 U / U	-15.2 U / U	-11.3 U / U	-9.47 U / U
Europium-155	D	E901.1	pCi/L	13.3 U / U	-3.95 U / U	-15.5 U / U	10.9 U / U
Gross Alpha	T	E900	pCi/L	2.86 UG / U	30.3 G /	10.3 G /	3 UG / U
Gross Alpha	D	E900	pCi/L	2.5	21.7 G /	9.99 G /	5.79 G /
Gross Beta	T	E900	pCi/L	5.08	12.8 G /	2.31 U / U	3.68
Gross Beta	D	E900	pCi/L	4.44	17.3 G /	5.18	4.67
Manganese-54	T	E901.1	pCi/L	-2.68 U / U	6.03 U / U	-7.80 U / U	-9.83 U / U
Manganese-54	D	E901.1	pCi/L	4.27 U / U	-9.83 U / U	-1.07 U / U	4.27 U / U
Potassium-40	T	E901.1	pCi/L	15.8 U / U	-75.4 U / U	-27.6 U / U	-84 U / U
Potassium-40	D	E901.1	pCi/L	3.3 U / U	-91.9 U / U	-83.9 U / U	15.1 U / U
Radium-226	T	E903	pCi/L	0.584	1.17	0.677	0.948
Radium-226	D	E903	pCi/L	0.486	1.37	0.605	0.772
Radium-228	T	E904	pCi/L	1.31	3.19	2.94	1.39
Radium-228	D	E904	pCi/L	1.25	3.02	1.15	1.04
Sodium-22	T	E901.1	pCi/L	-2.81 U / U	-2.97 U / U	0.295 U / U	0.746 U / U
Sodium-22	D	E901.1	pCi/L	-11.5 U / U	0.373 U / U	1.05 U / U	-0.372 U / U
Strontium-90	T	E905	pCi/L	-0.0647 U / U	0.131 U / U	0.310 U / U	-0.0213 U / U
Strontium-90	D	E905	pCi/L	0.137 U / U	0.997 U / U	0.132 U / U	0.141 U / U
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	1.91 F /	16.7	4.54 F /	2.35 F /
Uranium-233/234	D	A-01-R	pCi/L	2.12	15.9	5.22	2.24
Uranium-235/236	T	A-01-R	pCi/L	0.0319 U / U	0.761	0.137	0.125
Uranium-235/236	D	A-01-R	pCi/L	0.0493 U / U	0.592	0.185	0.0313 U / U
Uranium-238	T	A-01-R	pCi/L	1.41	14.9	3.24	1.54
Uranium-238	D	A-01-R	pCi/L	1.83	14.6	3.57	1.63

NOTES AND ABBREVIATIONS

pCi/L - picocuries per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS

F - MS/MSD Recovery and/or RPD exceeds the control limits.

G - The Sample MDC is greater than the requested RL.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

				Well Identifier	RD-33B	RD-33C	RD-34A	RD-34B
				Sample Name	RD-33B_022018_01_L	RD-33C_022118_01_L	RD-34A_030218_01_L	RD-34B_030118_01_L
				Sample Date	2/20/2018	2/21/2018	3/2/2018	3/1/2018
				Lab Name	TA STL	TA STL	TA STL	TA STL
				Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Actinium-228	T	E901.1	pCi/L	17.6 U / U	16.1 U / U	29.4 U / U	59.9 U / U
Actinium-228	D	E901.1	pCi/L	12.6 U / U	9.28 U / U	6.96 U / U	45.2 U / U
Americium-241	T	E901.1	pCi/L	1.15 U / U	-8.43 U / U	1.67 U / U	-12.3 U / U
Americium-241	D	E901.1	pCi/L	-0.763 U / U	-7.46 U / U	2.31 U / U	5.56 U / U
Antimony-125	T	E901.1	pCi/L	-15.2 U / U	14.5 U / U	17.8 U / U	11.5 U / U
Antimony-125	D	E901.1	pCi/L	0.543 U / U	14.6 U / U	8 U / U	-5.05 U / U
Barium-133	T	E901.1	pCi/L	-4.77 U / U	2.53 U / U	1.94 U / U	0 U / U
Barium-133	D	E901.1	pCi/L	7.76 U / U	-4.89 U / U	-7.27 U / U	1.02 U / U
Cesium-134	T	E901.1	pCi/L	-0.894 U / U	8.11 U / U	-2.53 U / U	2.51 U / U
Cesium-134	D	E901.1	pCi/L	3.95 U / U	8.97 U / U	0.802 U / U	10.9 U / U
Cesium-137	T	E901.1	pCi/L	-0.775 U / U	2.79 U / U	-0.0384 U / U	6.58 U / U
Cesium-137	D	E901.1	pCi/L	-2.22 U / U	1.79 U / U	-9.09 U / U	3.59 U / U
Cobalt-57	T	E901.1	pCi/L	-1.44 U / U	-0.370 U / U	-1.14 U / U	2.41 U / U
Cobalt-57	D	E901.1	pCi/L	-0.398 U / U	-1.05 U / U	2.61 U / U	6.6 U / U
Cobalt-60	T	E901.1	pCi/L	3.49 U / U	1.81 U / U	4.79 U / U	4.15 U / U
Cobalt-60	D	E901.1	pCi/L	1.09 U / U	-6.72 U / U	3.64 U / U	0.528 U / U
Europium-152	T	E901.1	pCi/L	11.4 U / U	11.3 U / U	-17.8 U / U	22.2
Europium-152	D	E901.1	pCi/L	6.80 U / U	3.76 U / U	12.6 U / U	11.5 U / U
Europium-154	T	E901.1	pCi/L	12.8 U / U	6.87 U / U	13.6 U / U	-46 U / U
Europium-154	D	E901.1	pCi/L	-48.5 U / U	37.9 U / U	-4.8 U / U	44.9
Europium-155	T	E901.1	pCi/L	-5.65 U / U	0.707 U / U	6.98 U / U	-17.6 U / U
Europium-155	D	E901.1	pCi/L	9.57 U / U	3.53 U / U	-2.26 U / U	-6.36 U / U
Gross Alpha	T	E900	pCi/L	0.667 U / U	7.1	11.3 G /	0.781 U / U
Gross Alpha	D	E900	pCi/L	2.96	2.89	8.27 G /	0.225 U / U
Gross Beta	T	E900	pCi/L	2.6	2.59	7.8	2.32
Gross Beta	D	E900	pCi/L	2.67	5.52	7.3	1.63
Manganese-54	T	E901.1	pCi/L	-4.08 U / U	4.49 U / U	-3.6 U / U	4.27 U / U
Manganese-54	D	E901.1	pCi/L	-3.57 U / U	2.44 U / U	-4.47 U / U	0.613 U / U
Potassium-40	T	E901.1	pCi/L	37.0 U / U	-27.6 U / U	18.5 U / U	15.1 U / U
Potassium-40	D	E901.1	pCi/L	-67.9 U / U	-104 U / U	71.5 U / U	-205 U / U
Radium-226	T	E903	pCi/L	0.512	1.25	0.677	0.235
Radium-226	D	E903	pCi/L	0.661	1.26	0.427	0.158
Radium-228	T	E904	pCi/L	2.92	4.55	0.882	0.622
Radium-228	D	E904	pCi/L	0.574	1.63	1.06	0.0759 U / U
Sodium-22	T	E901.1	pCi/L	4.45 U / U	-2.36 U / U	2.1 U / U	6.69 U / U
Sodium-22	D	E901.1	pCi/L	4.45 U / U	3.25 U / U	-9.01 U / U	-6.5 U / U
Strontium-90	T	E905	pCi/L	0.141 U / U	0.128 U / U	0.197 U / U	0.0984 U / U
Strontium-90	D	E905	pCi/L	0.241	0.187 U / U	0.0532 U / U	0.333
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	0.0210 UF / U	0.157 F /	5.3 F /	0.0186 UF / U
Uranium-233/234	D	A-01-R	pCi/L	0.0335 U / U	0.264	5.36	-0.00662 U / U
Uranium-235/236	T	A-01-R	pCi/L	0.000 U / U	-0.00983 U / U	0.416	-0.00533 U / U
Uranium-235/236	D	A-01-R	pCi/L	0.0236 U / U	0.0885 U / U	0.255	0.0214 U / U
Uranium-238	T	A-01-R	pCi/L	0.0131 U / U	0.0775 U / U	5.74	0 U / U
Uranium-238	D	A-01-R	pCi/L	-0.00436 U / U	0.0981 U / U	5.55	0.0383 U / U

NOTES AND ABBREVIATIONS

pCi/L - picocuries per liter

---- - Not analyzed

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TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS

F - MS/MSD Recovery and/or RPD exceeds the control limits.

G - The Sample MDC is greater than the requested RL.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

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J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

				Well Identifier	RD-34C	RD-54A	RD-59A	RD-59A
				Sample Name	RD-34C_030218_01_L	RD-54A_030118_01_L	RD-59A_022818_01_L	RD-59A_082018_01_L
				Sample Date	3/2/2018	3/1/2018	2/28/2018	8/20/2018
				Lab Name	TA STL	TA STL	TA STL	TA STL
				Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Actinium-228	T	E901.1	pCi/L	3.47 U / U	-15.2 U / U	-8.25 U / U	----
Actinium-228	D	E901.1	pCi/L	36.6 U / U	7.17 U / U	-58.7 U / U	----
Americium-241	T	E901.1	pCi/L	6.67 U / U	6.82 U / U	8.37 U / U	----
Americium-241	D	E901.1	pCi/L	6.63 U / U	6.25 U / U	-2.43 U / U	----
Antimony-125	T	E901.1	pCi/L	7.94 U / U	0.99 U / U	21.6 U / U	----
Antimony-125	D	E901.1	pCi/L	14.9 U / U	10.9 U / U	18.8 U / U	----
Barium-133	T	E901.1	pCi/L	4.87 U / U	-4.87 U / U	-2.38 U / U	----
Barium-133	D	E901.1	pCi/L	-2.61 U / U	2.47 U / U	-1.07 U / U	----
Cesium-134	T	E901.1	pCi/L	3.45 U / U	1.06 U / U	-2.95 U / U	----
Cesium-134	D	E901.1	pCi/L	7.75 U / U	-1.07 U / U	-0.931 U / U	----
Cesium-137	T	E901.1	pCi/L	0 U / U	1.39 U / U	-0.487 U / U	----
Cesium-137	D	E901.1	pCi/L	-7.47 U / U	0.649 U / U	-6.57 U / U	----
Cobalt-57	T	E901.1	pCi/L	-0.819 U / U	0.204 U / U	-0.0807 U / U	----
Cobalt-57	D	E901.1	pCi/L	5.76 U / U	2.14 U / U	3.34 U / U	----
Cobalt-60	T	E901.1	pCi/L	-6.57 U / U	1.25 U / U	-5.36 U / U	----
Cobalt-60	D	E901.1	pCi/L	-4.3 U / U	4.38 U / U	8.29	----
Europium-152	T	E901.1	pCi/L	16.6 U / U	19.9 U / U	18.9 U / U	----
Europium-152	D	E901.1	pCi/L	1.34 U / U	-3.28 U / U	2.69 U / U	----
Europium-154	T	E901.1	pCi/L	-2.07 U / U	20.5 U / U	5.76 U / U	----
Europium-154	D	E901.1	pCi/L	29.9 U / U	-55.3 U / U	-28.6 U / U	----
Europium-155	T	E901.1	pCi/L	-7.16 U / U	3.68 U / U	0.818 U / U	----
Europium-155	D	E901.1	pCi/L	-1.84 U / U	-6.52 U / U	5.66 U / U	----
Gross Alpha	T	E900	pCi/L	3.73	9.1 G /	1.26 UG / U	----
Gross Alpha	D	E900	pCi/L	1.38 U / U	3.37 G /	2.3 UG / U	----
Gross Beta	T	E900	pCi/L	3.93	5.11	1.91 U / U	----
Gross Beta	D	E900	pCi/L	5.05	4.03	4.65	----
Manganese-54	T	E901.1	pCi/L	3.7 U / U	-3.95 U / U	6.09 U / U	----
Manganese-54	D	E901.1	pCi/L	1.21 U / U	2.71 U / U	-8.42 U / U	----
Potassium-40	T	E901.1	pCi/L	35.5 U / U	-24.7 U / U	-40.2 U / U	----
Potassium-40	D	E901.1	pCi/L	26.7 U / U	-40.2 U / U	-65.5 U / U	----
Radium-226	T	E903	pCi/L	0.56	1.42	0.504	----
Radium-226	D	E903	pCi/L	0.724	0.811	0.55	----
Radium-228	T	E904	pCi/L	1.2	1.52	0.24 U / U	----
Radium-228	D	E904	pCi/L	1.23	1.06	0.162 U / U	----
Sodium-22	T	E901.1	pCi/L	-5.63 U / U	-6.72 U / U	3.05 U / U	----
Sodium-22	D	E901.1	pCi/L	1.49 U / U	4.5 U / U	-4.43 U / U	----
Strontium-90	T	E905	pCi/L	-0.0492 U / U	0.137 U / U	0.0032 U / U	0.181 U / U
Strontium-90	D	E905	pCi/L	-0.0091 U / U	0.0747 U / U	0.363	0.063 U / U
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	0.118 UF / U	2.95 F /	1.72	----
Uranium-233/234	D	A-01-R	pCi/L	0.091 U / U	2.97	2.12	----
Uranium-235/236	T	A-01-R	pCi/L	0 U / U	0.161	0.0279 U / U	----
Uranium-235/236	D	A-01-R	pCi/L	-0.00459 U / U	0 U / U	0.0588 U / U	----
Uranium-238	T	A-01-R	pCi/L	-0.0122 U / U	2.84	1.41	----
Uranium-238	D	A-01-R	pCi/L	0.00859 U / U	2.3	1.2	----

NOTES AND ABBREVIATIONS

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J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

			Well Identifier	RD-59A	RD-59B	RD-59C	RD-59C
			Sample Name	RD-59A_082018_36_L	RD-59B_022818_01_L	RD-59C_022818_01_L	RD-59C_022818_36_L
			Sample Date	8/20/2018	2/28/2018	2/28/2018	2/28/2018
			Lab Name	TA STL	TA STL	TA STL	TA STL
			Sample Type	FD	N	N	FD
Analyte	**Fraction**	**Method**	**Units**				
Actinium-228	T	E901.1	pCi/L	----	6.39 U / U	34.8 U / U	16.5 U / U
Actinium-228	D	E901.1	pCi/L	----	-11.7 U / U	16 U / U	24.9 U / U
Americium-241	T	E901.1	pCi/L	----	6.51 U / U	-0.353 U / U	2.31 U / U
Americium-241	D	E901.1	pCi/L	----	-11.5 U / U	-10.9 U / U	2.21 U / U
Antimony-125	T	E901.1	pCi/L	----	12.9 U / U	-22.5 U / U	7.64 U / U
Antimony-125	D	E901.1	pCi/L	----	5.86 U / U	4.52 U / U	4.29 U / U
Barium-133	T	E901.1	pCi/L	----	2.11 U / U	3.79 U / U	7.04 U / U
Barium-133	D	E901.1	pCi/L	----	-1.81 U / U	-4.23 U / U	-6.09 U / U
Cesium-134	T	E901.1	pCi/L	----	-1.39 U / U	5.01 U / U	2.6 U / U
Cesium-134	D	E901.1	pCi/L	----	6.03 U / U	0.598 U / U	11.9 U / U
Cesium-137	T	E901.1	pCi/L	----	-0.325 U / U	-6 U / U	-3.94 U / U
Cesium-137	D	E901.1	pCi/L	----	-5.84 U / U	-1.12 U / U	0.683 U / U
Cobalt-57	T	E901.1	pCi/L	----	1.73 U / U	2.73 U / U	-3.54 U / U
Cobalt-57	D	E901.1	pCi/L	----	-2.6 U / U	0.921 U / U	-1.99 U / U
Cobalt-60	T	E901.1	pCi/L	----	0.206 U / U	8.13 U / U	3.67 U / U
Cobalt-60	D	E901.1	pCi/L	----	-5.84 U / U	-0.876 U / U	6.75
Europium-152	T	E901.1	pCi/L	----	6.04 U / U	-10.8 U / U	9.54 U / U
Europium-152	D	E901.1	pCi/L	----	-6.04 U / U	4.68 U / U	-1.04 U / U
Europium-154	T	E901.1	pCi/L	----	18.1 U / U	19 U / U	8.74 U / U
Europium-154	D	E901.1	pCi/L	----	16.7 U / U	4.85 U / U	-35 U / U
Europium-155	T	E901.1	pCi/L	----	-10.2 U / U	8.15 U / U	-3.58 U / U
Europium-155	D	E901.1	pCi/L	----	-13.8 U / U	4.71 U / U	9.05 U / U
Gross Alpha	T	E900	pCi/L	----	2.17 UG / U	3.86	2.92
Gross Alpha	D	E900	pCi/L	----	2.02 UG / U	1.25 UG / U	2.74 UG / U
Gross Beta	T	E900	pCi/L	----	1.48 U / U	2.97	1.79 U / U
Gross Beta	D	E900	pCi/L	----	3.83	2.6	0.985 U / U
Manganese-54	T	E901.1	pCi/L	----	5.09 U / U	-0.89 U / U	4.41 U / U
Manganese-54	D	E901.1	pCi/L	----	3.6 U / U	1.32 U / U	-1.54 U / U
Potassium-40	T	E901.1	pCi/L	----	-1.48 U / U	-20.8 U / U	-114 U / U
Potassium-40	D	E901.1	pCi/L	----	-8.88 U / U	-27.9 U / U	-21.3 U / U
Radium-226	T	E903	pCi/L	----	0.664	0.455	0.492
Radium-226	D	E903	pCi/L	----	0.641	0.572	0.542
Radium-228	T	E904	pCi/L	----	1.42 / UJ	1.09 / UJ	1.09 / UJ
Radium-228	D	E904	pCi/L	----	0.95	0.675	0.967
Sodium-22	T	E901.1	pCi/L	----	2.58 U / U	3.73 U / U	1.05 U / U
Sodium-22	D	E901.1	pCi/L	----	0.469 U / U	-7.03 U / U	4.4 U / U
Strontium-90	T	E905	pCi/L	0.0672 U / U	0.172 U / U	0.0458 U / U	0.177 U / U
Strontium-90	D	E905	pCi/L	0.246 U / U	0.132 U / U	0.0326 U / U	0.464
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	----	0.278	0.214	0.247
Uranium-233/234	D	A-01-R	pCi/L	----	0.25	0.214	0.201
Uranium-235/236	T	A-01-R	pCi/L	----	0.0274 U / U	0 U / U	0 U / U
Uranium-235/236	D	A-01-R	pCi/L	----	-0.00501 U / U	0.0157 U / U	0 U / U
Uranium-238	T	A-01-R	pCi/L	----	0.11	0.123	0.145
Uranium-238	D	A-01-R	pCi/L	----	0.0857 / U	0.117	0 U / U

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J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

			Well Identifier	RD-59C	RD-63	RD-96	RD-98
			Sample Name	RD-59C_082018_01_L	RD-63_022118_01_L	RD-96_022118_01_L	RD-98_022818_01_L
			Sample Date	8/20/2018	2/21/2018	2/21/2018	2/28/2018
			Lab Name	TA STL	TA STL	TA STL	TA STL
			Sample Type	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**				
Actinium-228	T	E901.1	pCi/L	----	14.2 U / U	-46.6 U / U	-40.2 U / U
Actinium-228	D	E901.1	pCi/L	----	18.2 U / U	4.38 U / U	25.6 U / U
Americium-241	T	E901.1	pCi/L	----	11.5 U / U	1.20 U / U	0.529 U / U
Americium-241	D	E901.1	pCi/L	----	12.4 U / U	7.61 U / U	9.25 U / U
Antimony-125	T	E901.1	pCi/L	----	37.6 U / U	3.95 U / U	10.1 U / U
Antimony-125	D	E901.1	pCi/L	----	0.722 U / U	-0.246 U / U	8.8 U / U
Barium-133	T	E901.1	pCi/L	----	-5.52 U / U	5.02 U / U	10.1 U / U
Barium-133	D	E901.1	pCi/L	----	-8.18 U / U	4.13 U / U	-0.694 U / U
Cesium-134	T	E901.1	pCi/L	----	12.3 U / U	2.71 U / U	2.38 U / U
Cesium-134	D	E901.1	pCi/L	----	10.2 U / U	-5.68 U / U	5.17 U / U
Cesium-137	T	E901.1	pCi/L	----	-8.86 UG / U	-5.67 U / U	1.63 U / U
Cesium-137	D	E901.1	pCi/L	----	-12.2 UG / U	-7.57 U / U	0.972 U / U
Cobalt-57	T	E901.1	pCi/L	----	3.61 U / U	0.869 U / U	0.486 U / U
Cobalt-57	D	E901.1	pCi/L	----	3.82 U / U	1.43 U / U	-3.81 U / U
Cobalt-60	T	E901.1	pCi/L	----	-7.50 U / U	10.7	1.53 U / U
Cobalt-60	D	E901.1	pCi/L	----	-7.65 U / U	0.994 U / U	-3.05 U / U
Europium-152	T	E901.1	pCi/L	----	-14.8 U / U	8.36 U / U	10.3 U / U
Europium-152	D	E901.1	pCi/L	----	-0.483 U / U	6.39 U / U	16.8 U / U
Europium-154	T	E901.1	pCi/L	----	55.9 U / U	12.6 U / U	46.1
Europium-154	D	E901.1	pCi/L	----	-61.2 U / U	-51.7 U / U	8.02 U / U
Europium-155	T	E901.1	pCi/L	----	19.7 U / U	-7.16 U / U	-1.58 U / U
Europium-155	D	E901.1	pCi/L	----	-2.83 U / U	7.07 U / U	4.71 U / U
Gross Alpha	T	E900	pCi/L	----	15.9 G /	11.8 G /	10.7 G /
Gross Alpha	D	E900	pCi/L	----	12.8 G /	8.00 G /	3.26 UG / U
Gross Beta	T	E900	pCi/L	----	8.17	10.5	123
Gross Beta	D	E900	pCi/L	----	4.43	7.89	119
Manganese-54	T	E901.1	pCi/L	----	-0.0930 U / U	-4.92 U / U	-5.48 U / U
Manganese-54	D	E901.1	pCi/L	----	-7.37 U / U	-6.36 U / U	-2.57 U / U
Potassium-40	T	E901.1	pCi/L	----	75.4 U / U	38.4 U / U	-112 U / U
Potassium-40	D	E901.1	pCi/L	----	-19.6 U / U	1.35 U / U	-114 U / U
Radium-226	T	E903	pCi/L	----	1.18	1.24	0.275
Radium-226	D	E903	pCi/L	----	1.25	1.11	0.206
Radium-228	T	E904	pCi/L	----	2.34	1.83 / J	13.1
Radium-228	D	E904	pCi/L	----	0.838	1.61 / J	12.2
Sodium-22	T	E901.1	pCi/L	----	8.95 U / U	2.10 U / U	-2.61 U / U
Sodium-22	D	E901.1	pCi/L	----	3.84 U / U	-1.48 U / U	4.45 U / U
Strontium-90	T	E905	pCi/L	0.296 U / U	0.0945 U / U	0.114 U / U	65.8
Strontium-90	D	E905	pCi/L	0.266 U / U	0.143 U / U	0.0277 U / U	75.7
Tritium	T	E906.0	pCi/L	----	----	----	----
Uranium-233/234	T	A-01-R	pCi/L	----	4.40 F /	6.49 F /	4.03
Uranium-233/234	D	A-01-R	pCi/L	----	3.49	5.82	3.79
Uranium-235/236	T	A-01-R	pCi/L	----	0.252	0.323	0.13
Uranium-235/236	D	A-01-R	pCi/L	----	0.214	0.161 U / U	0.274
Uranium-238	T	A-01-R	pCi/L	----	5.34	4.99	1.93
Uranium-238	D	A-01-R	pCi/L	----	4	5.34	2.37

NOTES AND ABBREVIATIONS

pCi/L - picocuries per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA STL - Test America St. Louis, Missouri

LAB / VALIDATION FLAGS

F - MS/MSD Recovery and/or RPD exceeds the control limits.

G - The Sample MDC is greater than the requested RL.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

UJ - Analyzed for, but not detected. Reported quantitation limit is approximate and may be inaccurate or imprecise. Result shown is the Method Detection Limit.

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

TABLE 15
METALS ANALYTICAL RESULTS, 2018 - AREA IV
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CA

		Well Identifier		C-8	DD-139	DD-140	DD-141	DD-142
		Sample Name		C-8_021918_01_L	DD-139_022218_01_L	DD-140_022718_01_L	DD-141_022718_01_L	DD-142_022218_01_L
		Sample Date		2/19/2018	2/22/2018	2/27/2018	2/27/2018	2/22/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Aluminum	T	SW6010C	mg/L	0.11	0.47 / J+	0.055 J / J	2	0.98 F1 / J+
Aluminum	D	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.039 J / J	0.062 J / J	0.1 U / U
Antimony	T	SW6020A	mg/L	0.002 U / U	0.00097 J / U	0.002 U / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.002 U^ / U	0.0014 J^ / U	0.002 U / U	0.002 U /	0.002 U^ / U
Arsenic	T	SW6020A	mg/L	0.0015 J / J	0.00061 J / J	0.0019 J / J	0.0015 J / J	0.0011 J / J
Arsenic	D	SW6020A	mg/L	0.0015 J / J	0.0006 J / J	0.002 J / J	0.00085 J / J	0.005 U / U
Barium	T	SW6020A	mg/L	0.045	0.04	0.023	0.093	0.043
Barium	D	SW6020A	mg/L	0.052	0.038	0.023	0.073	0.03
Beryllium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.00017 J / J	0.00011 J / J
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.00021 J / J	0.001 U / U
Boron	T	SW6010C	mg/L	0.027 J / J	0.035 J / J	0.035 J / J	0.039 J / J	0.43
Boron	D	SW6010C	mg/L	0.026 JB / U	0.038 JB / U	0.03 J / J	0.049 J / J	0.39 B /
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U^ / U	0.001 U / U	0.001 U / U	0.001 U^ / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	100	110	110	110	110
Calcium	D	SW6010C	mg/L	85	110 B /	100	120	100 B /
Chromium	T	SW6020A	mg/L	0.002 U / U	0.0013 J / J	0.002 U / U	0.005	0.0025
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.00095 J / J	0.0021	0.0011	0.01	0.00092 J / J
Cobalt	D	SW6020A	mg/L	0.00073 J / J	0.00017 J / J	0.001	0.00048 J / J	0.001 U / U
Copper	T	SW6020A	mg/L	0.00074 J / J	0.002 B / U	0.0012 J / J	0.0036	0.0035 B /
Copper	D	SW6020A	mg/L	0.002 U / U	0.00068 J / J	0.00061 J / J	0.002 U / U	0.002 U / U
Iron	T	SW6010C	mg/L	0.32	1.4 / J+	0.36	3.3	1.5 F1 / J+
Iron	D	SW6010C	mg/L	0.1 U / U	0.054 JB / U	0.14	0.11	0.022 JB / U
Lead	T	SW6020A	mg/L	0.00025 J^ / J+	0.00077 JB / U	0.00032 J / J	0.0022	0.0013 B /
Lead	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.00023 JB / U	0.001 U / U
Magnesium	T	SW6010C	mg/L	6.7 / J	15	22	26	22
Magnesium	D	SW6010C	mg/L	5.8 / J	15 B /	21	23	20 B /
Manganese	T	SW6020A	mg/L	0.014	0.057 ^ / J+	0.1	0.43	0.18 ^ /
Manganese	D	SW6020A	mg/L	0.0023	0.01	0.1 F1 / J-	0.026	0.0017
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.0018 JB / U	0.0014 J / J	0.0042	0.0018 J / J	0.002 / J+
Molybdenum	D	SW6020A	mg/L	0.002	0.0013 J / J	0.0045	0.0015 J / J	0.0014 J / J
Nickel	T	SW6020A	mg/L	0.00096 J / J	0.0021	0.0018 J / J	0.0055	0.0018 J / J
Nickel	D	SW6020A	mg/L	0.0011 J / J	0.0024	0.0018 J / J	0.00081 J / J	0.0004 J / J
Potassium	T	SW6010C	mg/L	3.2	4.5	4.8	5	4.5
Potassium	D	SW6010C	mg/L	2.7 J / J	4.8	4.4	4.4	3.9
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.00089 J / J	0.005 U / U	0.005 U / U	0.0043 J / J
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.0035 J / J
Silver	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.000064 J / J	0.005 U / U
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.000033 J / J	0.005 U / U
Sodium	T	SW6010C	mg/L	38 B /	35	46	44	140
Sodium	D	SW6010C	mg/L	32	35	43	44	120
Strontium	T	SW6010C	mg/L	0.36	0.31	0.3	0.3	0.3
Strontium	D	SW6010C	mg/L	0.3	0.32	0.28	0.29	0.27
Thallium	T	SW6020A	mg/L	0.001 U / U	0.000061 J / J	0.001 U / U	0.00011 J / J	0.000058 J / J
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.000093 J / J	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.005 U / U	0.0043 J / J	0.0017 J / J	0.0071	0.0052
Vanadium	D	SW6020A	mg/L	0.005 U / U	0.0018 J / U	0.0018 J / J	0.0015 J / J	0.005 U / U
Zinc	T	SW6020A	mg/L	0.026	0.0062 JB / U	0.0038 J / J	0.019	0.013 B /
Zinc	D	SW6020A	mg/L	0.024	0.063	0.0045 J / J	0.0023 J / J	0.01 U / U

NOTES AND ABBREVIATIONS

mg/L - milligrams per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA DEN - Test America Denver, Colorado

LAB / / VALIDATION FLAGS

^ - Instrument related QC is outside acceptance limits.

B / - Compound was found in the blank and sample.

F1 - MS and/or MSD Recovery is outside acceptance limits.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

J+ - The result is an estimated quantity, but the result may be biased high.

J- - The result is an estimated quantity, but the result may be biased low.

		Well Identifier		DD-143	DD-143	DD-144	DD-145	DS-43
		Sample Name		DD-143_022618_01_L	DD-143_022618_36_L	DD-144_022218_01_L	DD-145_021918_01_L	DS-43_022218_01_L
		Sample Date		2/26/2018	2/26/2018	2/22/2018	2/19/2018	2/22/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	FD	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Aluminum	T	SW6010C	mg/L	0.71	0.44	0.63 / J+	0.12	0.29 / J+
Aluminum	D	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.29 B /	0.1 U / U	0.28 B /
Antimony	T	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.00048 J / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.0006 J^ / U	0.002 U^ / U	0.002 U^ / U
Arsenic	T	SW6020A	mg/L	0.001 J / J	0.0011 J / J	0.0017 J / J	0.00048 J / J	0.005 U / U
Arsenic	D	SW6020A	mg/L	0.00076 J / J	0.00078 J / J	0.00092 J / J	0.00034 J / J	0.005 U / U
Barium	T	SW6020A	mg/L	0.04	0.04	0.068	0.037	0.079 ^
Barium	D	SW6020A	mg/L	0.033	0.034	0.071	0.036	0.085
Beryllium	T	SW6020A	mg/L	0.00013 J / J	0.000092 J / J	0.00011 J / J	0.001 U / U	0.00011 J / J
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00045 J / J	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	0.083 J / J	0.079 J / J	0.14	0.071 J / J	0.16
Boron	D	SW6010C	mg/L	0.085 J / J	0.083 J / J	0.14 B /	0.071 JB / U	0.16 B /
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U^ / U	0.001 U / U	0.001 U^ / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	160	160	120	100	86
Calcium	D	SW6010C	mg/L	170	170	120 B /	99	82 B /
Chromium	T	SW6020A	mg/L	0.0016 J / J	0.0013 J / J	0.0022	0.00094 JB / U	0.00069 J / J
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.00061 J / J	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.00044 J / J	0.00039 J / J	0.0011	0.00031 J / J	0.0003 J / U
Cobalt	D	SW6020A	mg/L	0.00022 J / J	0.00026 J / J	0.00067 J / J	0.00023 J / J	0.00027 J / J
Copper	T	SW6020A	mg/L	0.0013 J / J	0.00088 J / J	0.0027 B /	0.00063 J / J	0.00091 JB / U
Copper	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.00061 J / J	0.002 U / U	0.002 U / U
Iron	T	SW6010C	mg/L	1.7	1.3	8.7 / J+	0.76	2.5 / J+
Iron	D	SW6010C	mg/L	0.19	0.18	4.5 B /	0.11	1.5 B /
Lead	T	SW6020A	mg/L	0.0011	0.00063 J / J	0.0016 B /	0.001 U^ / U	0.00054 JB / U
Lead	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00053 J / J	0.001 U / U	0.00024 J / J
Magnesium	T	SW6010C	mg/L	31	29	20	12 / J	23
Magnesium	D	SW6010C	mg/L	31	30	20 B /	11 / J	23 B /
Manganese	T	SW6020A	mg/L	0.1	0.098	0.14 ^ / J+	0.035	0.048 ^ /
Manganese	D	SW6020A	mg/L	0.074 / J	0.074 / J	0.08	0.023	0.044
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.0035	0.0036	0.0016 J / J	0.002 B / U	0.0028
Molybdenum	D	SW6020A	mg/L	0.0037	0.0038	0.0015 J / J	0.0022	0.0024
Nickel	T	SW6020A	mg/L	0.0014 J / J	0.0011 J / J	0.0034	0.0011 J / J	0.00092 J / J
Nickel	D	SW6020A	mg/L	0.00092 J / J	0.0009 J / J	0.0026	0.00096 J / J	0.0011 J / J
Potassium	T	SW6010C	mg/L	5.4	5.1	5.9	3.8	6.2
Potassium	D	SW6010C	mg/L	5.4	5.4	5.5	3.7	5.7
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.0012 J / J	0.005 U / U
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.000039 J / J	0.005 U / U	0.005 U / U
Sodium	T	SW6010C	mg/L	62	60	71	74 B /	150
Sodium	D	SW6010C	mg/L	64	62	66	70	140
Strontium	T	SW6010C	mg/L	0.33	0.32	0.28	0.46	0.3
Strontium	D	SW6010C	mg/L	0.35	0.34	0.26	0.45	0.28
Thallium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.000072 J / J	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00016 J / J	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.0019 J / U	0.0017 J / U	0.0078	0.005 U / U	0.0012 J / J
Vanadium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.0025 J / U	0.005 U / U	0.005 U / U
Zinc	T	SW6020A	mg/L	0.016	0.012	0.0079 JB / U	0.01 U / U	0.0091 JB / U
Zinc	D	SW6020A	mg/L	0.0026 J / J	0.0025 J / J	0.003 J / J	0.0035 J / J	0.0024 J / J

NOTES AND ABBREVIATIONS

mg/L - milligrams per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA DEN - Test America Denver, Colorado

LAB / / VALIDATION FLAGS

^ - Instrument related QC is outside acceptance limits.

B / - Compound was found in the blank and sample.

F1 - MS and/or MSD Recovery is outside acceptance limits.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

J+ - The result is an estimated quantity, but the result may be biased high.

J- - The result is an estimated quantity, but the result may be biased low.

				Well Identifier	DS-44	DS-46	DS-47	PZ-105	PZ-108
				Sample Name	DS-44_022318_01_L	DS-46_022718_01_L	DS-47_022318_01_L	PZ-105_021918_01_L	PZ-108_021918_01_L
				Sample Date	2/23/2018	2/27/2018	2/23/2018	2/19/2018	2/19/2018
				Lab Name	TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
				Sample Type	N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**						
Aluminum	T	SW6010C	mg/L	1 / J+	0.049 J / J	0.066 J / J+	0.4	0.29
Aluminum	D	SW6010C	mg/L	0.064 J / J	0.1 U / U	0.1 U / U	0.1 U / U	0.036 J / J
Antimony	T	SW6020A	mg/L	0.00041 J / U	0.00068 J / J	0.002 U / U	0.00061 J / U	0.00087 J / U
Antimony	D	SW6020A	mg/L	0.002 U / U	0.00068 J / J	0.002 U / U	0.00046 J^ / UJ	0.002 U^ / U
Arsenic	T	SW6020A	mg/L	0.00086 J / J	0.00038 J / J	0.00067 J / J	0.0012 J / J	0.00098 J / J
Arsenic	D	SW6020A	mg/L	0.00059 J / J	0.005 U / U	0.0011 J / J	0.0007 J / J	0.001 J / J
Barium	T	SW6020A	mg/L	0.051 ^ / J+	0.052	0.042 ^ / J+	0.032	0.027
Barium	D	SW6020A	mg/L	0.045	0.057	0.043	0.028	0.026
Beryllium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Beryllium	D	SW6020A	mg/L	0.000096 J / J	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	0.09 J / J	0.038 J / J	0.042 J / J	0.14	0.18
Boron	D	SW6010C	mg/L	0.088 J / J	0.035 J / J	0.039 J / J	0.14 B /	0.17 B /
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.00027 J / J
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	110	130	85	110	140
Calcium	D	SW6010C	mg/L	96	120	79	100	130
Chromium	T	SW6020A	mg/L	0.0013 J / J	0.002 U / U	0.002 U / U	0.0051 B /	0.0023 B /
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.0047	0.0016 J / J
Cobalt	T	SW6020A	mg/L	0.00087 J / J	0.0021	0.0008 J / J	0.00036 J / J	0.00028 J / J
Cobalt	D	SW6020A	mg/L	0.00034 J / J	0.0012	0.0001 J / J	0.000062 J / J	0.00012 J / J
Copper	T	SW6020A	mg/L	0.0046 B / J+	0.0014 J / J	0.0019 JB / U	0.0021	0.0025
Copper	D	SW6020A	mg/L	0.00056 J / J	0.0016 J / J	0.002 U / U	0.0013 J / J	0.0016 J / J
Iron	T	SW6010C	mg/L	1.6 / J+	2.8	0.23 / J+	0.64	0.49
Iron	D	SW6010C	mg/L	0.24	0.87	0.1 U / U	0.029 J / J	0.094 J / J
Lead	T	SW6020A	mg/L	0.00094 JB / U	0.001 U / U	0.00053 JB / U	0.00038 J / J	0.00022 J / J
Lead	D	SW6020A	mg/L	0.00032 J / J	0.001 U / U	0.00019 J / J	0.001 U / U	0.001 U / U
Magnesium	T	SW6010C	mg/L	21	19	20	21 / J	33 / J
Magnesium	D	SW6010C	mg/L	19	18	19	19 / J	31 / J
Manganese	T	SW6020A	mg/L	0.19 ^ / J	0.1	0.0095 ^ / J	0.035	0.065
Manganese	D	SW6020A	mg/L	0.089 B /	0.07	0.0015 B / J+	0.0057	0.049
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.0081	0.00045 J / J	0.0037	0.016 B /	0.0081 B /
Molybdenum	D	SW6020A	mg/L	0.0078	0.00051 J / J	0.004	0.018	0.0085
Nickel	T	SW6020A	mg/L	0.002	0.0079	0.0014 J / J	0.0014 J / J	0.0028
Nickel	D	SW6020A	mg/L	0.00095 J / J	0.0082	0.001 J / J	0.00089 J / J	0.0023
Potassium	T	SW6010C	mg/L	4.6	4.9	4.6	6.4	7.6
Potassium	D	SW6010C	mg/L	3.8	4.3	4.3	5.9	7
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.0015 J / J	0.005 U / U
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	T	SW6020A	mg/L	0.0004 J / J	0.005 U / U	0.005 U / U	0.005 U / U	0.00019 JB / U
Silver	D	SW6020A	mg/L	0.000059 J / U	0.005 U / U	0.005 U / U	0.005 U / U	0.000036 J / J
Sodium	T	SW6010C	mg/L	53	52	39	93 B /	81 B /
Sodium	D	SW6010C	mg/L	51	52	37	88	82
Strontium	T	SW6010C	mg/L	0.29	0.39	0.27	0.49	0.36
Strontium	D	SW6010C	mg/L	0.26	0.34	0.25	0.46	0.34
Thallium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.000093 J / J	0.001 U / U	0.000073 J / J	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.0033 J / J	0.005 U / U	0.0037 J / J	0.0012 J / U	0.005 U / U
Vanadium	D	SW6020A	mg/L	0.0015 J / J	0.005 U / U	0.003 J / J	0.0012 J / U	0.00069 J / U
Zinc	T	SW6020A	mg/L	0.0055 JB / U	0.0026 J / J	0.0052 JB / U	0.013	0.0087 J / J
Zinc	D	SW6020A	mg/L	0.01 U / U	0.0029 J / J	0.0058 JB / U	0.039	0.0076 J / J

NOTES AND ABBREVIATIONS

mg/L - milligrams per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA DEN - Test America Denver, Colorado

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^ - Instrument related QC is outside acceptance limits.

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J+ - The result is an estimated quantity, but the result may be biased high.

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		Well Identifier		PZ-120	RD-07	RD-17	RD-19	RD-21
		Sample Name		PZ-120_022618_01_L	RD-07_022618_01_L	RD-17_030218_01_L	RD-19_022818_01_L	RD-21_022018_01_L
		Sample Date		2/26/2018	2/26/2018	3/2/2018	2/28/2018	2/20/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Aluminum	T	SW6010C	mg/L	1.6	0.1 U / U	0.1 U / U	0.1 U / U	0.064 J / J
Aluminum	D	SW6010C	mg/L	0.097 J / J	0.1 U / U	0.1 U / U	0.1 U / U	0.1 U / U
Antimony	T	SW6020A	mg/L	0.0015 J / J	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.00054 J / J	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U^ / U
Arsenic	T	SW6020A	mg/L	0.0028 J / J	0.005 U / U	0.00055 J / J	0.005 U / U	0.005 U / U
Arsenic	D	SW6020A	mg/L	0.0018 J / J	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Barium	T	SW6020A	mg/L	0.046	0.035	0.13 B /	0.081 B /	0.045
Barium	D	SW6020A	mg/L	0.014	0.036	0.12	0.08	0.05
Beryllium	T	SW6020A	mg/L	0.00012 J / J	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	1.3	0.088 J / J	0.14	0.11	0.053 J / J
Boron	D	SW6010C	mg/L	1.4	0.083 J / J	0.15	0.1	0.053 JB / U
Cadmium	T	SW6020A	mg/L	0.00034 J / J	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	73	97	100	210	110
Calcium	D	SW6010C	mg/L	73	100	100	190	110
Chromium	T	SW6020A	mg/L	0.011	0.002 U / U	0.002 U / U	0.00065 J / J	0.002 U / U
Chromium	D	SW6020A	mg/L	0.0045	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.0025	0.000054 J / J	0.0016	0.001 U / U	0.0001 J / J
Cobalt	D	SW6020A	mg/L	0.00035 J / J	0.001 U / U	0.0015	0.0001 J / J	0.001 U / U
Copper	T	SW6020A	mg/L	0.046	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Copper	D	SW6020A	mg/L	0.0045	0.002 U / U	0.002 U / U	0.00078 J / J	0.00079 J / J
Iron	T	SW6010C	mg/L	2.4	0.1 U / U	7.4	0.04 J / J	0.28
Iron	D	SW6010C	mg/L	0.18	0.1 U / U	6.2	0.1 U / U	0.1 U / U
Lead	T	SW6020A	mg/L	0.02	0.001 U / U	0.0083	0.001 U / U	0.00037 J^ / J+
Lead	D	SW6020A	mg/L	0.0012 B /	0.001 U / U	0.0008 JB / U	0.0007 JB / U	0.001 U / U
Magnesium	T	SW6010C	mg/L	15	14	22	42	6.8 / J
Magnesium	D	SW6010C	mg/L	15	13	23	38	6.9 / J
Manganese	T	SW6020A	mg/L	1.1	0.0045	0.18 B /	0.0019 B /	0.0042
Manganese	D	SW6020A	mg/L	0.069 / J	0.0016 / J	0.18	0.01	0.0012
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.018	0.0011 J / J	0.00053 J / J	0.00075 J / J	0.0023 B /
Molybdenum	D	SW6020A	mg/L	0.017	0.0011 J / J	0.00058 J / J	0.00076 J / J	0.0024
Nickel	T	SW6020A	mg/L	0.012	0.00037 J / J	0.00087 J / J	0.0023	0.00043 J / J
Nickel	D	SW6020A	mg/L	0.0049	0.00041 J / J	0.0011 J / J	0.0019 J / J	0.002 U / U
Potassium	T	SW6010C	mg/L	2.9 J / J	2.9 J / J	3.8	6.7	2 J / J
Potassium	D	SW6010C	mg/L	2.5 J / J	3	4.5	6.1	2 J / J
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.0013 J / J	0.005 U / U	0.005 U / U	0.0034 J / J
Selenium	D	SW6020A	mg/L	0.005 U / U	0.0012 J / J	0.005 U / U	0.005 U / U	0.0019 J / J
Silver	T	SW6020A	mg/L	0.00005 J / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Sodium	T	SW6010C	mg/L	83	36	39	90 B /	83 B /
Sodium	D	SW6010C	mg/L	82	37	41	87	68
Strontium	T	SW6010C	mg/L	0.21	0.24	0.36	0.45	0.29
Strontium	D	SW6010C	mg/L	0.21	0.24	0.36	0.41	0.29
Thallium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.0069	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Vanadium	D	SW6020A	mg/L	0.0023 J / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Zinc	T	SW6020A	mg/L	0.35	0.011	1.8	0.2	0.026
Zinc	D	SW6020A	mg/L	0.066	0.012	1.4	0.18	0.022

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U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

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		Well Identifier		RD-33A	RD-33B	RD-33C	RD-34A	RD-34B
		Sample Name		RD-33A_030118_01_L	RD-33B_022018_01_L	RD-33C_022118_01_L	RD-34A_030218_01_L	RD-34B_030118_01_L
		Sample Date		3/1/2018	2/20/2018	2/21/2018	3/2/2018	3/1/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	N	N	N	N
Analyte	**Fraction**	**Method**	**Units**					
Aluminum	T	SW6010C	mg/L	0.018 J / J	0.1 U / U	0.1 U / U	0.1 U / U	0.1 U / U
Aluminum	D	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.1 U / U	0.1 U / U	0.1 U / U
Antimony	T	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Arsenic	T	SW6020A	mg/L	0.0032 J / J	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Arsenic	D	SW6020A	mg/L	0.0026 J / J	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Barium	T	SW6020A	mg/L	0.05 B /	0.027 ^ /	0.068 ^ /	0.038 B /	0.0079 B /
Barium	D	SW6020A	mg/L	0.047	0.029	0.066	0.036	0.0065
Beryllium	T	SW6020A	mg/L	0.00012 J / J	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	0.024 J / J	0.019 J / J	0.031 J / J	0.13	0.021 J / J
Boron	D	SW6010C	mg/L	0.021 J / J	0.024 J / J	0.032 J / J	0.13	0.02 J / J
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U^ / U	0.001 U^ / U	0.001 U / U	0.001 U / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U^ / U	0.001 U^ / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	65	24	68	160	2.8
Calcium	D	SW6010C	mg/L	63	23	69	160	2.4
Chromium	T	SW6020A	mg/L	0.00066 J / J	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.0002 J / J	0.001 U / U	0.00015 J / J	0.0018	0.000078 J / J
Cobalt	D	SW6020A	mg/L	0.000088 J / J	0.001 U / U	0.00016 J / J	0.001	0.001 U / U
Copper	T	SW6020A	mg/L	0.0052	0.0015 JB / U	0.00089 JB / U	0.0011 J / J	0.002 U / U
Copper	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Iron	T	SW6010C	mg/L	0.12	0.74	1.4	0.46	0.57
Iron	D	SW6010C	mg/L	0.044 J / J	0.46	2.1	0.14	0.1 U / U
Lead	T	SW6020A	mg/L	0.00099 J / J	0.00045 JB / U	0.00055 JB / U	0.001 U / U	0.00027 J / J
Lead	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00023 J / J	0.001 U / U	0.001 U / U
Magnesium	T	SW6010C	mg/L	14	6.2	14	40	0.25
Magnesium	D	SW6010C	mg/L	14	6.3	14	40	0.23
Manganese	T	SW6020A	mg/L	0.018 B /	0.034 ^ /	0.16 ^ /	0.18 B /	0.0034 B /
Manganese	D	SW6020A	mg/L	0.016	0.039 B /	0.16 B /	0.13	0.00057 J / J
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.0013 J / J	0.0022	0.0014 J / J	0.00047 J / J	0.0017 J / J
Molybdenum	D	SW6020A	mg/L	0.0012 J / J	0.0023	0.0013 J / J	0.00062 J / J	0.0025
Nickel	T	SW6020A	mg/L	0.003	0.002 U / U	0.002 U / U	0.0015 J / J	0.002 U / U
Nickel	D	SW6020A	mg/L	0.0012 J / J	0.002 U / U	0.00039 J / J	0.0015 J / J	0.00054 J / J
Potassium	T	SW6010C	mg/L	3.1	3.2	3.5	4	2 J / J
Potassium	D	SW6010C	mg/L	3.1	2.9 J / J	3.5	4.3	2 J / J
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Sodium	T	SW6010C	mg/L	48	46	46	61	41
Sodium	D	SW6010C	mg/L	44	44	46	55	36
Strontium	T	SW6010C	mg/L	0.38	0.11	0.44	0.34	0.019
Strontium	D	SW6010C	mg/L	0.37	0.11	0.44	0.34	0.017
Thallium	T	SW6020A	mg/L	0.000068 J / J	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.00078 J / J	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U /	0.005 U / U
Vanadium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Zinc	T	SW6020A	mg/L	0.13	0.012 B /	0.047 B /	0.04	0.13
Zinc	D	SW6020A	mg/L	0.028	0.0058 JB / U	0.12 B /	0.06	0.0076 J / J

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		Well Identifier		RD-34C	RD-54A	RD-59A	RD-59B	RD-59B
		Sample Name		RD-34C_030218_01_L	RD-54A_030118_01_L	RD-59A_022818_01_L	RD-59B_022818_01_L	RD-59B_022818_36_L
		Sample Date		3/2/2018	3/1/2018	2/28/2018	2/28/2018	2/28/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	N	N	N	FD
Analyte	**Fraction**	**Method**	**Units**					
Aluminum	T	SW6010C	mg/L	0.1 U / U	2.3	0.1 U / U	0.1 U / U	0.1 U / U
Aluminum	D	SW6010C	mg/L	0.1 U / U	0.043 J / J	0.1 U / U	0.1 U / U	0.1 U / U
Antimony	T	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Arsenic	T	SW6020A	mg/L	0.005 U / U	0.0035 J / J	0.00085 J / J	0.005 U / U	0.005 U / U
Arsenic	D	SW6020A	mg/L	0.005 U / U	0.0015 J / J	0.001 J / J	0.005 U / U	0.005 U / U
Barium	T	SW6020A	mg/L	0.06 B /	0.056 B /	0.06 B /	0.042 B /	0.04 B /
Barium	D	SW6020A	mg/L	0.055	0.05	0.062	0.041	0.04
Beryllium	T	SW6020A	mg/L	0.001 U / U	0.000081 J / J	0.001 U / U	0.001 U / U	0.001 U / U
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00034 J / J	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	0.021 J / J	0.025 J / J	0.078 J / J	0.064 J / J	0.068 J / J
Boron	D	SW6010C	mg/L	0.018 J / J	0.025 J / J	0.073 J / J	0.074 J / J	0.066 J / J
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U	0.001 U / U
Calcium	T	SW6010C	mg/L	49	110	98	48	51
Calcium	D	SW6010C	mg/L	45	110	95	56	52
Chromium	T	SW6020A	mg/L	0.002 U / U	0.0053	0.002 U / U	0.002 U / U	0.002 U / U
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.00029 J / J	0.0067	0.00018 J / J	0.001 U / U	0.001 U / U
Cobalt	D	SW6020A	mg/L	0.001 U / U	0.00029 J / J	0.00023 J / J	0.001 U / U	0.001 U / U
Copper	T	SW6020A	mg/L	0.002 U / U	0.035	0.002 U / U	0.0041	0.002 U / U
Copper	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.0012 J / J	0.001 J / J	0.002 U / U
Iron	T	SW6010C	mg/L	3.5	12	0.1 U / U	0.073 J / J	0.13
Iron	D	SW6010C	mg/L	1.6	0.16	0.1 U / U	0.079 J / J	0.076 J / J
Lead	T	SW6020A	mg/L	0.00054 J / J	0.015	0.001 U / U	0.00026 J / J	0.001 U / U
Lead	D	SW6020A	mg/L	0.001 U / U	0.00068 JB / U	0.001 U / U	0.00025 JB / U	0.00027 JB / U
Magnesium	T	SW6010C	mg/L	16	8.7	28	13	14
Magnesium	D	SW6010C	mg/L	14	8.2	27	16	14
Manganese	T	SW6020A	mg/L	0.049 B /	0.3 B /	0.35 B /	0.023 B /	0.022 B /
Manganese	D	SW6020A	mg/L	0.047	0.0087	0.37	0.023	0.022
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.00023	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.00091 J / J	0.0018 J / J	0.0024	0.0015 J / J	0.0014 J / J
Molybdenum	D	SW6020A	mg/L	0.0014 J / J	0.0013 J / J	0.0023	0.0012 J / J	0.0013 J / J
Nickel	T	SW6020A	mg/L	0.00032 J / J	0.0044	0.0015 J / J	0.002 U / U	0.002 U / U
Nickel	D	SW6020A	mg/L	0.002 U / U	0.001 J / J	0.0016 J / J	0.002 U / U	0.002 U / U
Potassium	T	SW6010C	mg/L	2.4 J / J	2.6 J / J	3.9	2.2 J / J	2.2 J / J
Potassium	D	SW6010C	mg/L	2.4 J / J	2.6 J / J	3.9	2.6 J / J	2.2 J / J
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Silver	T	SW6020A	mg/L	0.005 U / U	0.000037 J / J	0.005 U / U	0.005 U / U	0.005 U / U
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U	0.005 U / U
Sodium	T	SW6010C	mg/L	39	36	130 B /	90 B /	96 B /
Sodium	D	SW6010C	mg/L	35	34	120	97	90
Strontium	T	SW6010C	mg/L	0.25	0.32	0.69	0.54	0.57
Strontium	D	SW6010C	mg/L	0.23	0.32	0.66	0.62	0.58
Thallium	T	SW6020A	mg/L	0.001 U / U	0.000062 J / J	0.001 U / U	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.000097 J / J	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.005 U / U	0.0048 J / J	0.005 U / U	0.005 U / U	0.005 U / U
Vanadium	D	SW6020A	mg/L	0.005 U / U	0.0006 J / J	0.005 U / U	0.005 U / U	0.005 U / U
Zinc	T	SW6020A	mg/L	0.35	0.53	0.01 U / U	0.011	0.0042 J / J
Zinc	D	SW6020A	mg/L	0.043	0.4	0.0055 J / J	0.0046 J / J	0.0042 J / J

NOTES AND ABBREVIATIONS

mg/L - milligrams per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA DEN - Test America Denver, Colorado

LAB / / VALIDATION FLAGS

^ - Instrument related QC is outside acceptance limits.

B / - Compound was found in the blank and sample.

F1 - MS and/or MSD Recovery is outside acceptance limits.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

J+ - The result is an estimated quantity, but the result may be biased high.

J- - The result is an estimated quantity, but the result may be biased low.

		Well Identifier		RD-59C	RD-96	RD-96
		Sample Name		RD-59C_022818_01_L	RD-96_022118_01_L	RD-96_022118_36_L
		Sample Date		2/28/2018	2/21/2018	2/21/2018
		Lab Name		TA-DEN	TA-DEN	TA-DEN
		Sample Type		N	N	FD
Analyte	**Fraction**	**Method**	**Units**			
Aluminum	T	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.1 U / U
Aluminum	D	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.1 U / U
Antimony	T	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U
Antimony	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U
Arsenic	T	SW6020A	mg/L	0.005 U / U	0.00038 J / J	0.00044 J / J
Arsenic	D	SW6020A	mg/L	0.005 U / U	0.00039 J / J	0.0006 J / J
Barium	T	SW6020A	mg/L	0.05 B /	0.037 ^ /	0.029 ^ /
Barium	D	SW6020A	mg/L	0.051 F1 /	0.037	0.038
Beryllium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U
Beryllium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U
Boron	T	SW6010C	mg/L	0.073 J / J	0.028 J / J	0.026 J / J
Boron	D	SW6010C	mg/L	0.072 J / J	0.025 J / J	0.026 J / J
Cadmium	T	SW6020A	mg/L	0.001 U / U	0.001 U^ / U	0.001 U^ / U
Cadmium	D	SW6020A	mg/L	0.001 U / U	0.001 U^ / U	0.001 U^ / U
Calcium	T	SW6010C	mg/L	31	120	120
Calcium	D	SW6010C	mg/L	28	100	100
Chromium	T	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.00054 J / J
Chromium	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U
Cobalt	T	SW6020A	mg/L	0.001 U / U	0.00021 J / J	0.00023 J / J
Cobalt	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U
Copper	T	SW6020A	mg/L	0.002 U / U	0.002 B /	0.0023 B /
Copper	D	SW6020A	mg/L	0.002 U / U	0.002 U / U	0.002 U / U
Iron	T	SW6010C	mg/L	0.022 J / J	0.057 J / J	0.061 J / J
Iron	D	SW6010C	mg/L	0.1 U / U	0.1 U / U	0.1 U / U
Lead	T	SW6020A	mg/L	0.00019 J / J	0.00028 JB / U	0.00021 JB / U
Lead	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.00037 J / J
Magnesium	T	SW6010C	mg/L	11	37	36
Magnesium	D	SW6010C	mg/L	10	33	32
Manganese	T	SW6020A	mg/L	0.014 B /	0.023 ^ /	0.019 ^ /
Manganese	D	SW6020A	mg/L	0.016	0.0035 B /	0.0034 B /
Mercury	T	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U
Mercury	D	SW7470A	mg/L	0.0002 U / U	0.0002 U / U	0.0002 U / U
Molybdenum	T	SW6020A	mg/L	0.0012 J / J	0.00087 J / J	0.00069 J / J
Molybdenum	D	SW6020A	mg/L	0.0012 J / J	0.0012 J / J	0.0014 J / J
Nickel	T	SW6020A	mg/L	0.002 U / U	0.0026	0.0022
Nickel	D	SW6020A	mg/L	0.002 U / U	0.0012 J / J	0.00096 J / J
Potassium	T	SW6010C	mg/L	1.6 J / J	5.1	5.1
Potassium	D	SW6010C	mg/L	1.4 J / J	4.5	4.5
Potassium, trimethylsilanolate	T	SW6010C	mg/L	----	----	----
Potassium, trimethylsilanolate	D	SW6010C	mg/L	----	----	----
Selenium	T	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U
Selenium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U
Silver	T	SW6020A	mg/L	0.005 U / U	0.000075 J / J	0.000071 J / J
Silver	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.005 U / U
Sodium	T	SW6010C	mg/L	140 B /	53	53
Sodium	D	SW6010C	mg/L	130	48	47
Strontium	T	SW6010C	mg/L	0.63	0.29	0.29
Strontium	D	SW6010C	mg/L	0.58	0.25	0.25
Thallium	T	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U
Thallium	D	SW6020A	mg/L	0.001 U / U	0.001 U / U	0.001 U / U
Tin	T	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U
Tin	D	SW6020A	mg/L	0.01 U / U	0.01 U / U	0.01 U / U
Vanadium	T	SW6020A	mg/L	0.005 U / U	0.00052 J / J	0.005 U / U
Vanadium	D	SW6020A	mg/L	0.005 U / U	0.005 U / U	0.00055 J / J
Zinc	T	SW6020A	mg/L	0.0045 J / J	0.01 U / U	0.0025 JB / U
Zinc	D	SW6020A	mg/L	0.0029 J / J	0.0024 JB / U	0.0022 JB / U

NOTES AND ABBREVIATIONS

mg/L - milligrams per liter

---- - Not analyzed

N - Normal Sample

FD - Field Duplicate Sample

TA DEN - Test America Denver, Colorado

LAB / / VALIDATION FLAGS

^ - Instrument related QC is outside acceptance limits.

B / - Compound was found in the blank and sample.

F1 - MS and/or MSD Recovery is outside acceptance limits.

U - Analyzed for, but not detected above reported sample quantitation limit. Result shown is the Method Detection Limit (MDL).

J - Result is an estimated quantity. Associated numerical value is approximate concentration of analyte in sample.

J+ - The result is an estimated quantity, but the result may be biased high.

J- - The result is an estimated quantity, but the result may be biased low.

FIGURES

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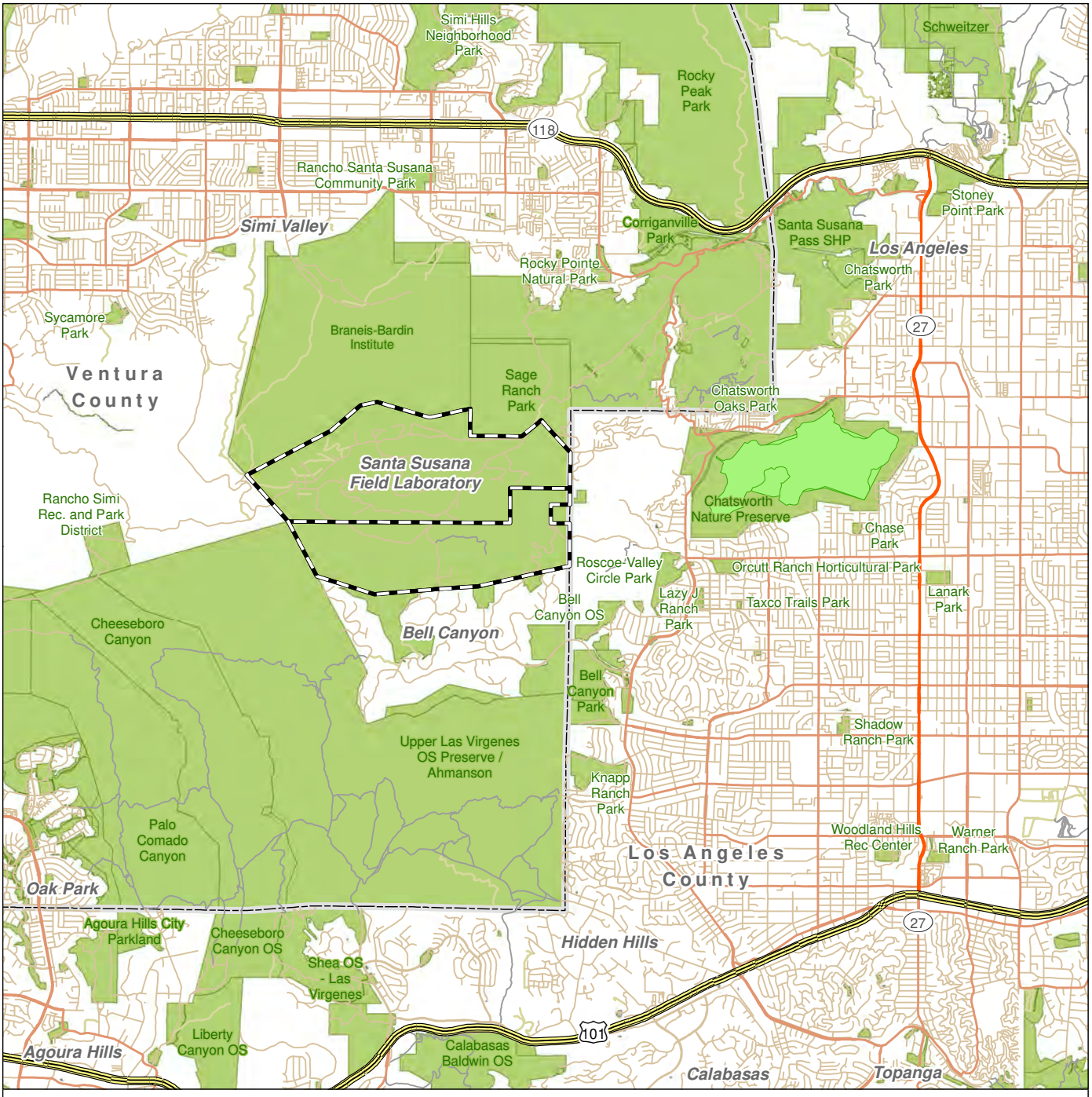


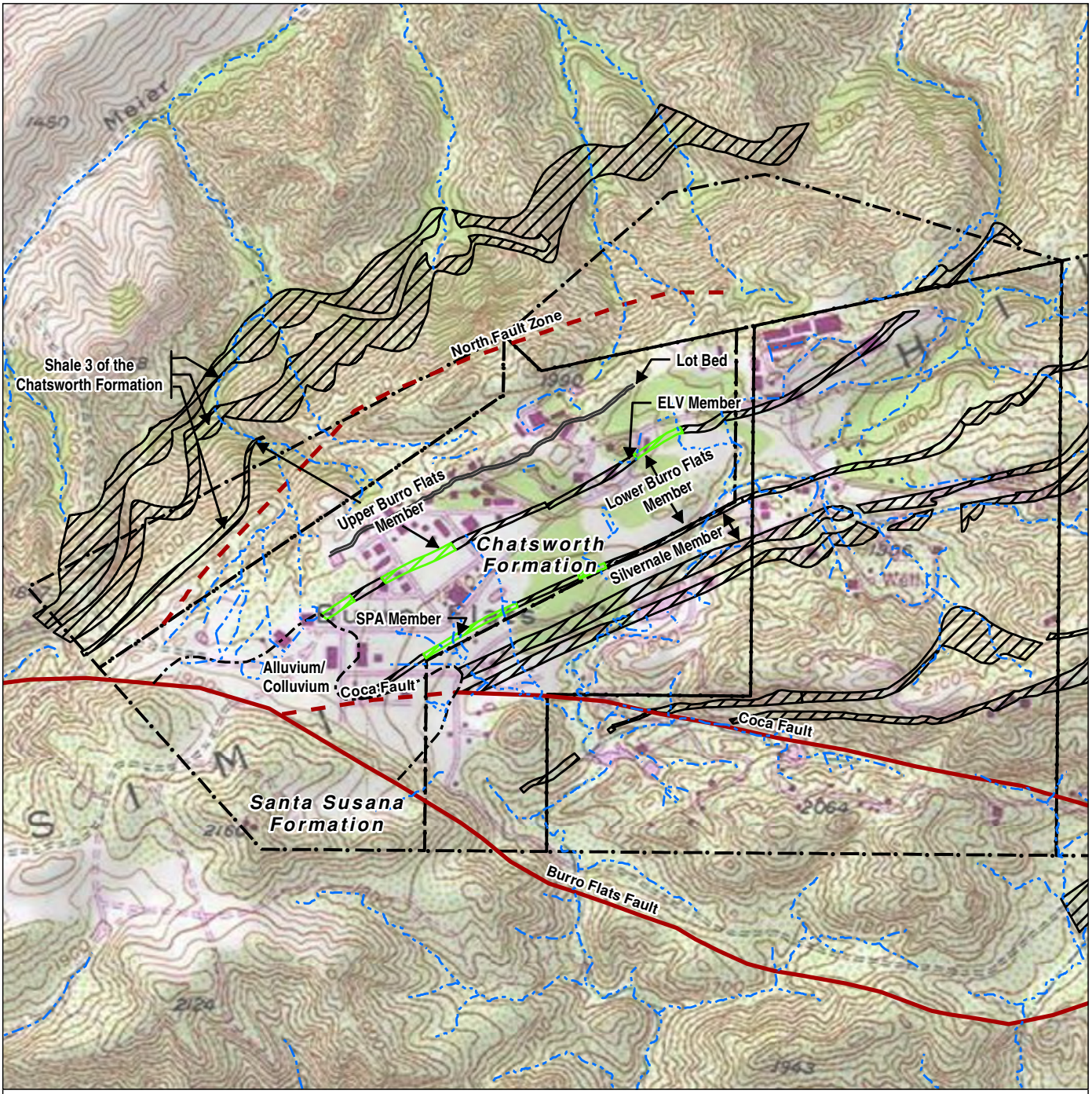
Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

Service Layer Credits:
- Park and Open Space Source: California Protected Areas Database (CPAD - www.calands.org), Santa Monica Mountains Conservancy, Mountains Recreation and Conservation Authority, National Park Service (2013); Protected Areas Database, US Geological Survey Gap Analysis Program, 2011; Ventura County Resource Management Agency, 2014.
- Street Source: Esri, TomTom, 2007.
- Census County Boundary Source: United States Census Bureau, TIGER/Line Shapefiles, August 2014.

NORTHWIND INC.

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 1_SSFL_2018GWAnnual_Facility_Location.mxd

FIGURE 1
Facility Location Map



Notes:
- Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
- Geologic data provided by MWH from Draft Site-wide Groundwater Remedial Investigation Report (MWH, 2009).

Service Layer Credits:
- Topo Source: Copyright:© 2013 National Geographic Society, i-cubed

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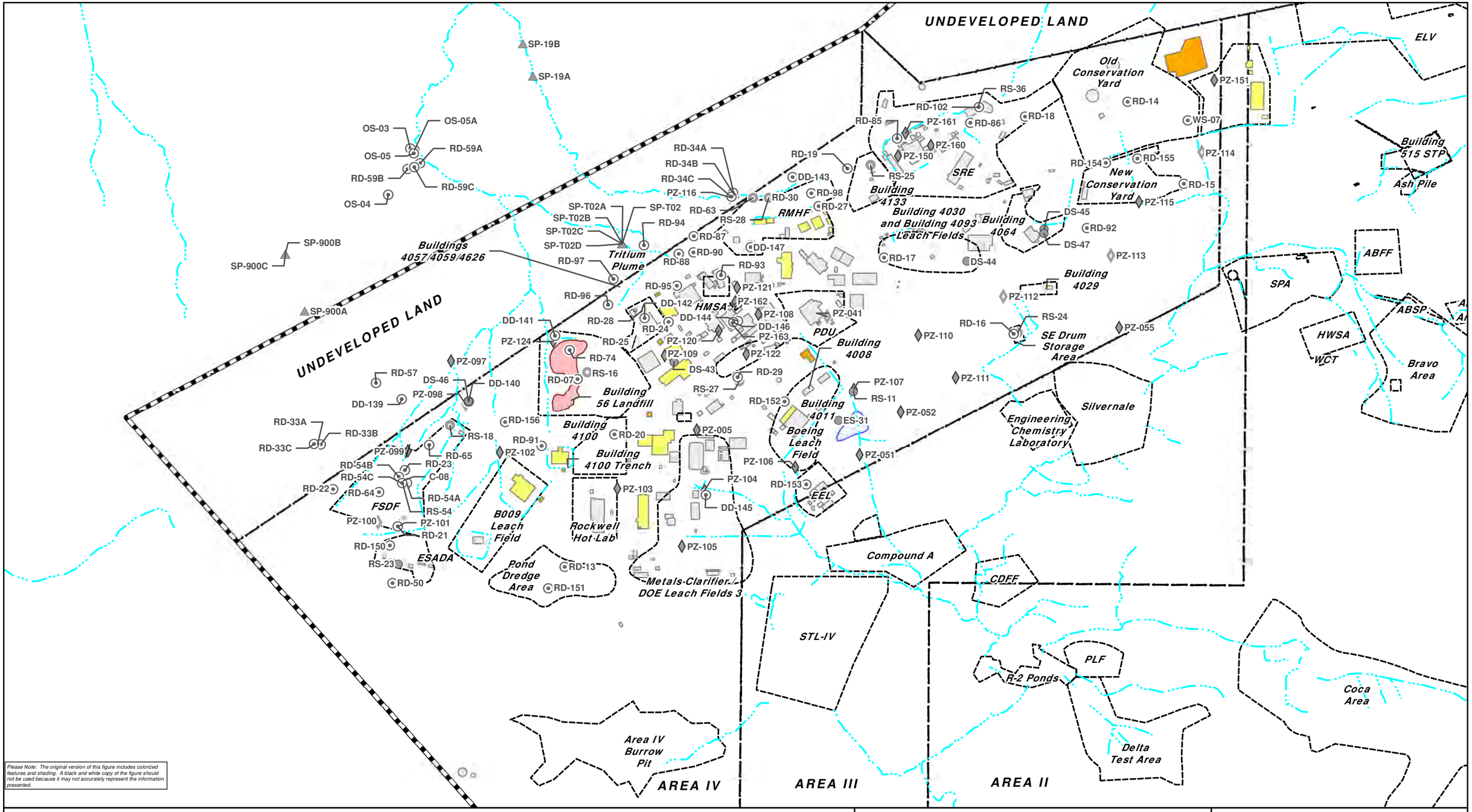
C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 2_SSFL_2018GWAnnual_AreaIV_Geology.mxd

FIGURE 2
SSFL Geologic Map



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

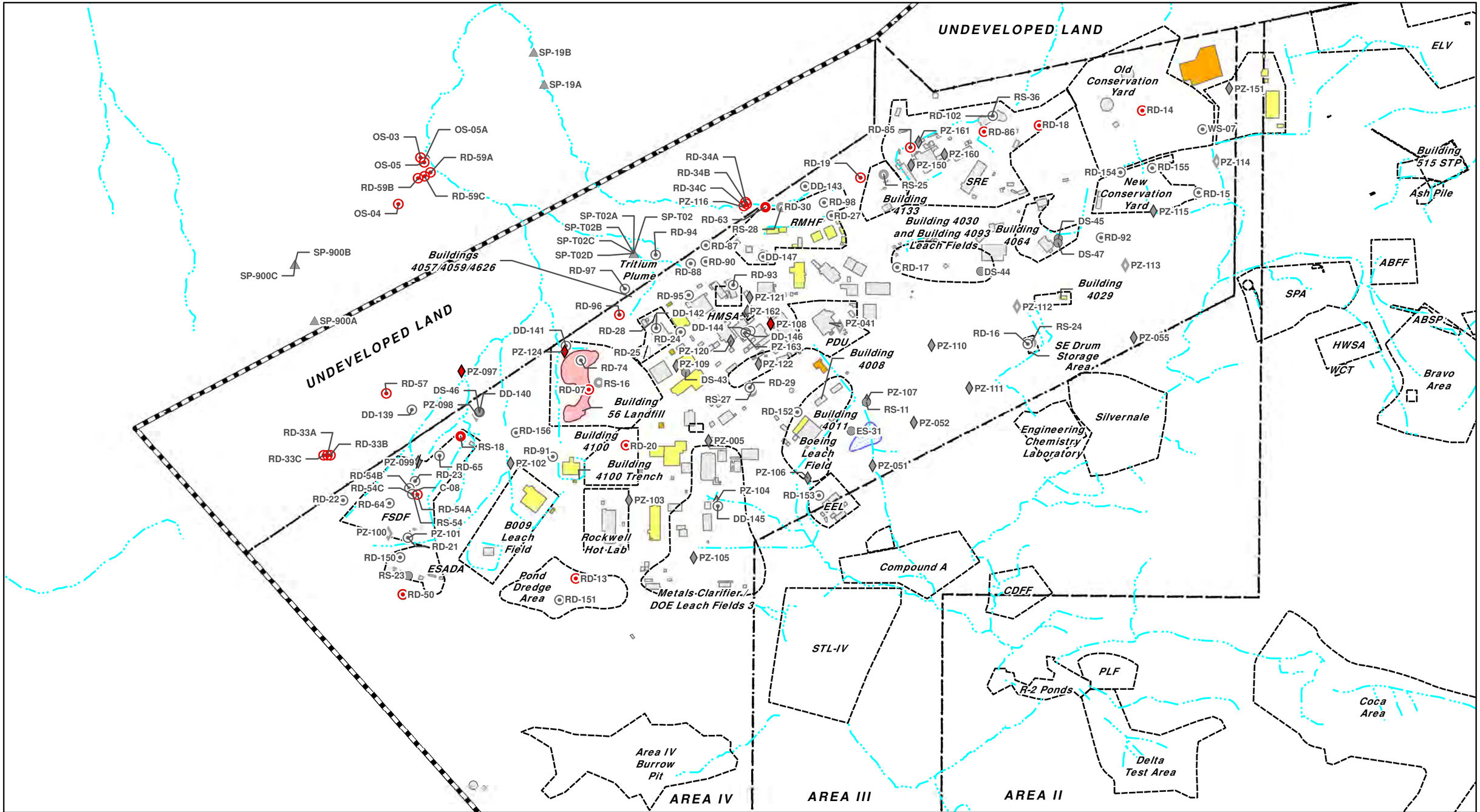
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
LOCATION OF WELLS, PIEZOMETERS, AND SEEPS
FIGURE 3

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 3_SSFL_2018GWAnnual_Well_PZ_Seep_Locs_11x17.mxd



Symbol Color for Site-wide and LUFT Program Monitoring Locations

- Site-wide Program

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.

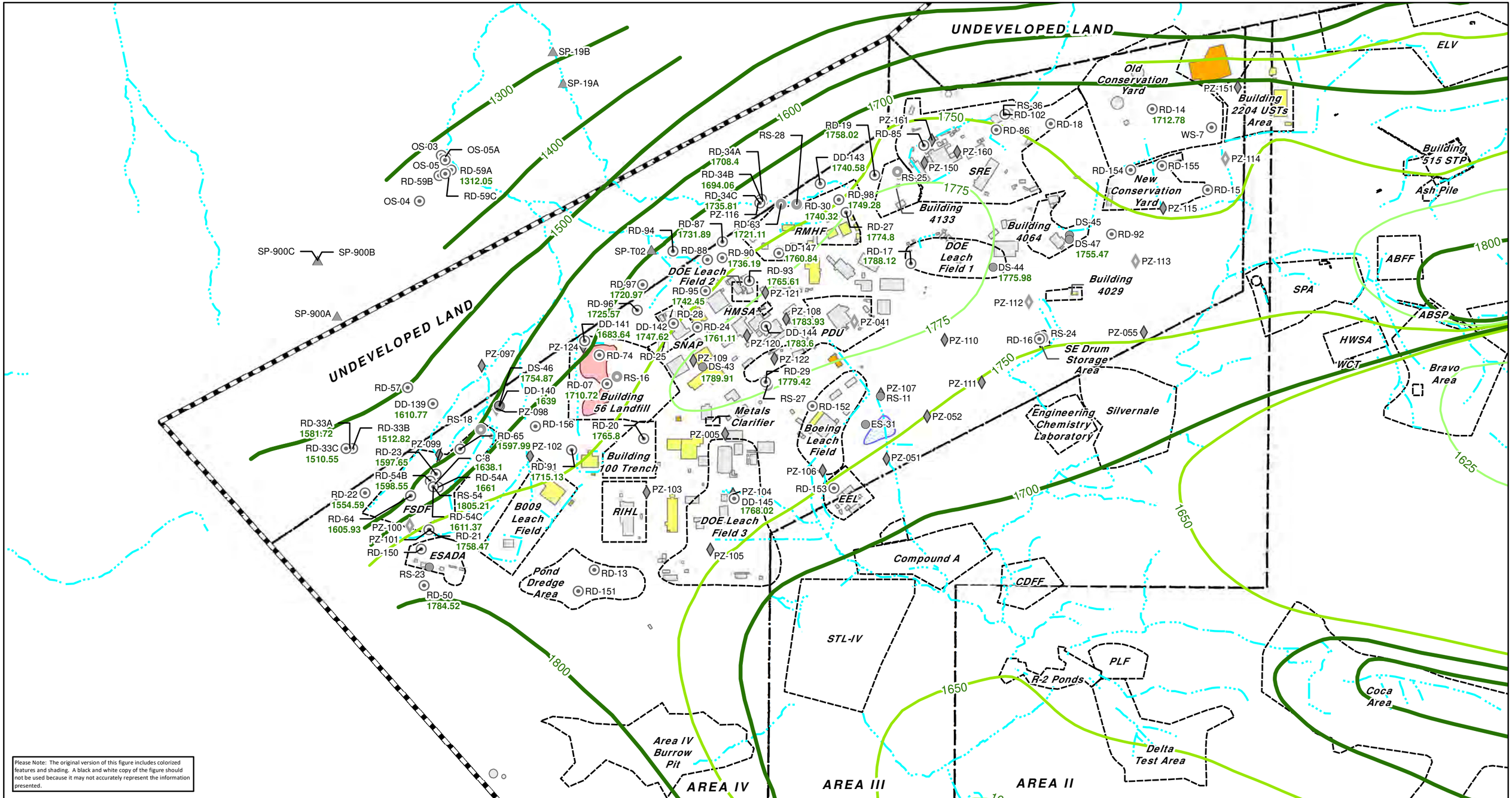
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
SITE-WIDE PROGRAM MONITORING LOCATIONS
FIGURE 4

C:\Temp\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 4_SSFL_2018GWAnnual_SWP_MW_Locs_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- RI Site Boundary
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Approximate Groundwater Elevation Contours (feet above sea level)

- 25-foot Contour
- 50-foot Contour
- 100-foot Contour
- 1724.99 Groundwater Level Elevation in feet above mean sea level

Notes:
Original GIS layers provided by MWH/Boeing; Updated by North Wind Inc. as needed
Information used to develop the groundwater elevation contours includes topography; the approximate elevations of identified seeps and springs; water levels measured in seep piezometers gauged during 2018; historical water level data for wells and piezometers not gauged during 2018; and the recognition that groundwater level discontinuities coincide with certain fault segments and other geologic structures. Elevations at DD-139 and RS-54 were anomalous

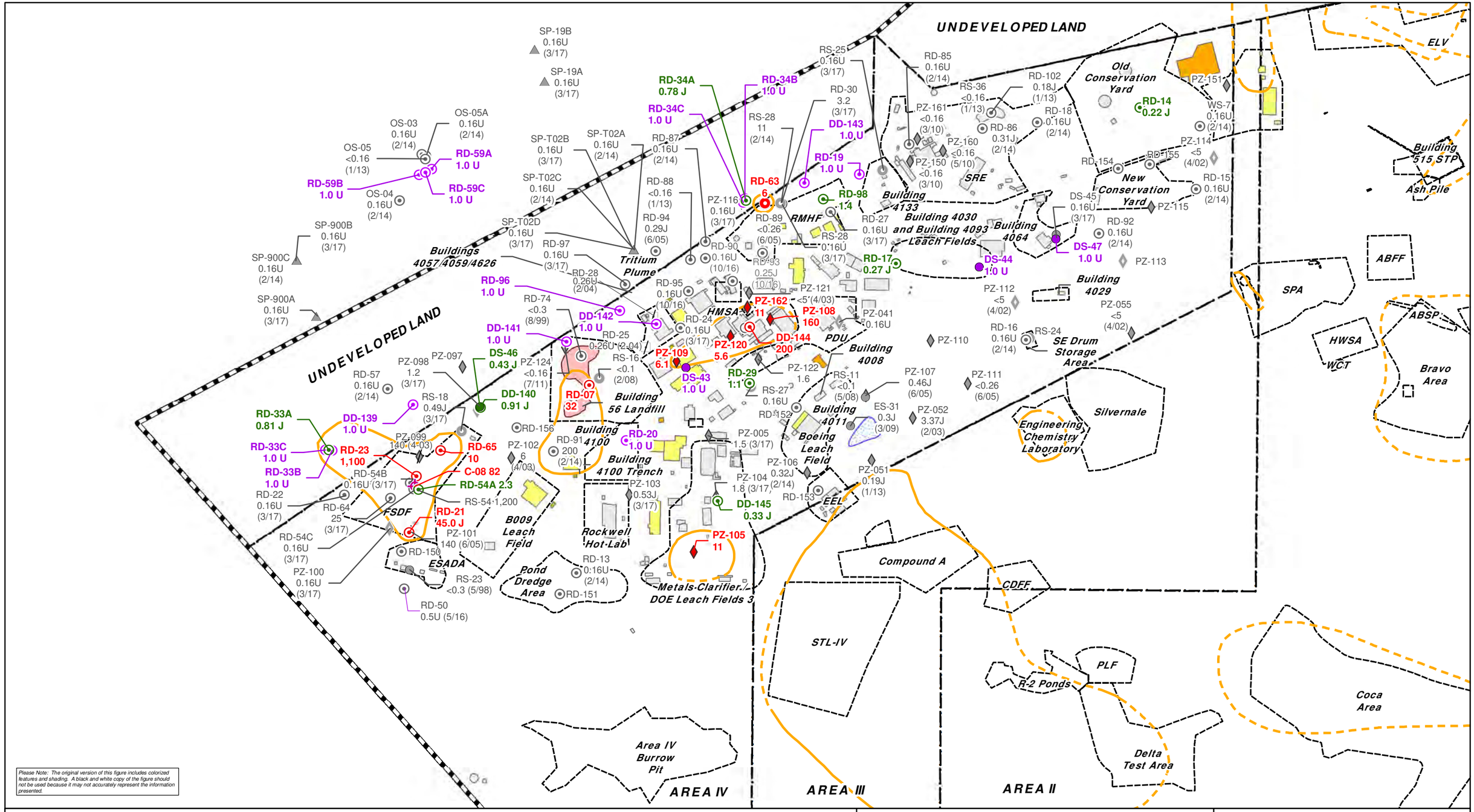
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
GROUNDWATER ELEVATION CONTOUR MAP, 4th Quarter 2018
FIGURE 5

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 5_SSFL_2018_Q4_GW_Contours_11x17_chatsworth.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Trichloroethene in Groundwater above Primary MCL of 5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

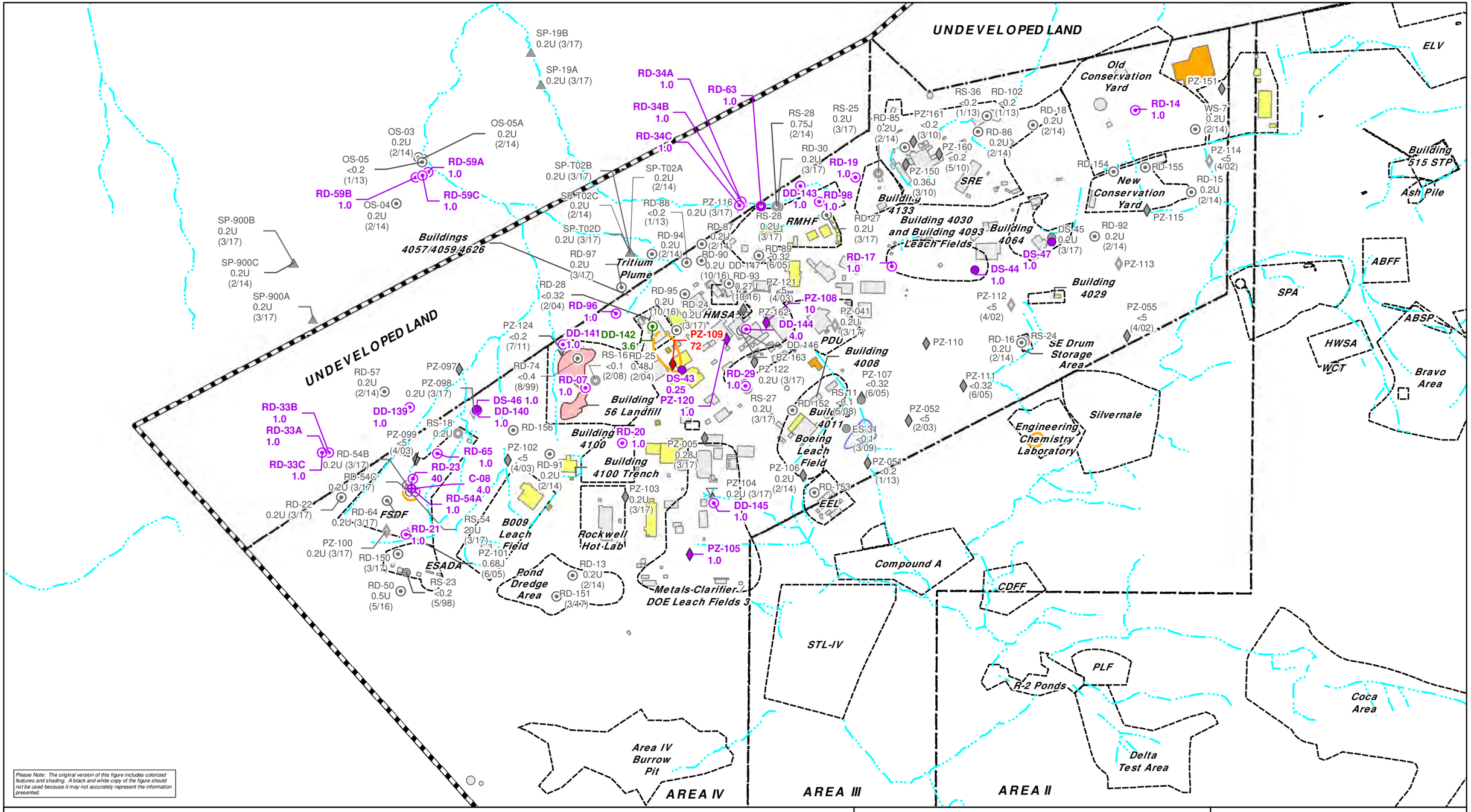
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRICHLOROETHENE IN GROUNDWATER, 2018
FIGURE 6

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 6_SSFL_2018GWAnnual_TCE_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results
- Detected above MCL
- Detected above detection limit, below MCL
- Not Detected bove detetion limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater
- *Trichloroethene in Groundwater above Primary MCL of 5 ug/L (boundary dashed where inferred)*

Well Type and Groundwater Zone

Groundwater Monitoring Wells
- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers
- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs
- Seep/spring

Other
- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap
- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures
- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
GIS layers provided by MWH/Boeing.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

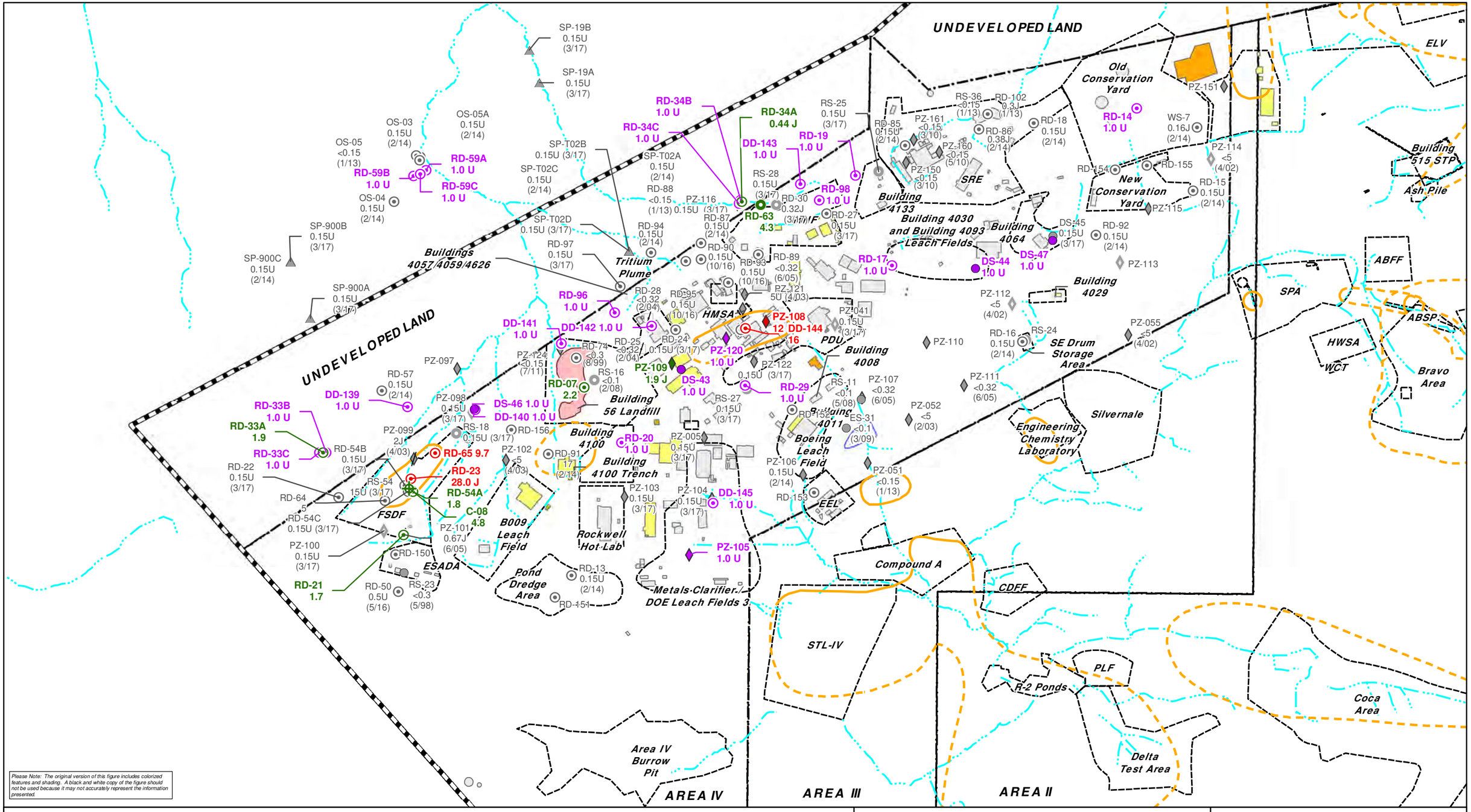
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TETRACHLOROETHENE IN GROUNDWATER, 2018
FIGURE 7

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 7_SSFL_2018GWAnnual_PCE_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- cis-1,2-Dichloroethene in Groundwater above Cal MCL of 6 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.

1 inch = 547.150259 feet

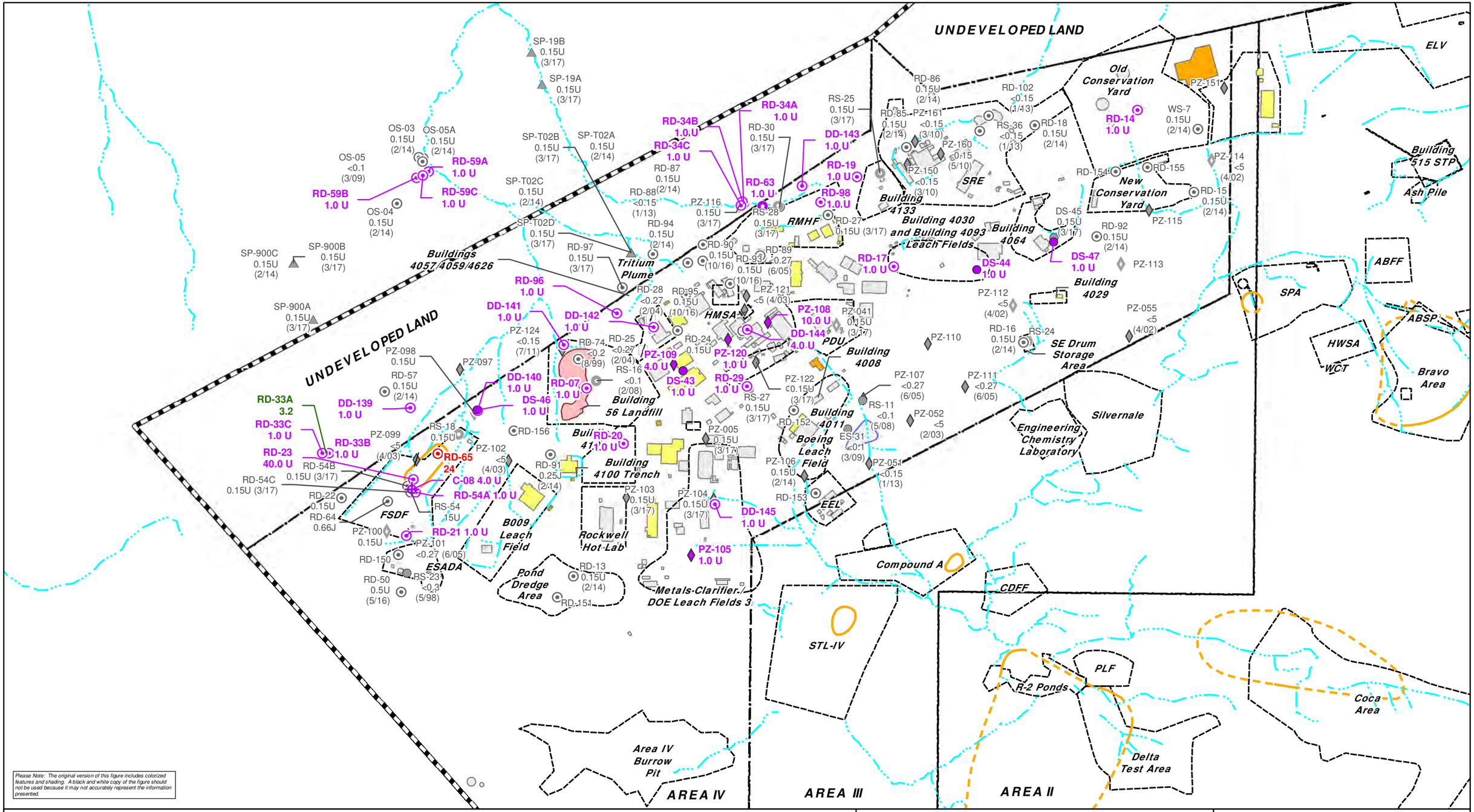
0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF CIS-1,2-DICHLOROETHENE IN GROUNDWATER, 2018
FIGURE 8

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 8_SSFL_2018GWAnnual_cis12DCE_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above screening level
- Detected below screening level
- Not Detected
- Available Well/Piezometer

Areas of Impacted Groundwater

- trans-1,2-Dichloroethene in Groundwater above Cal MCL of 10 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

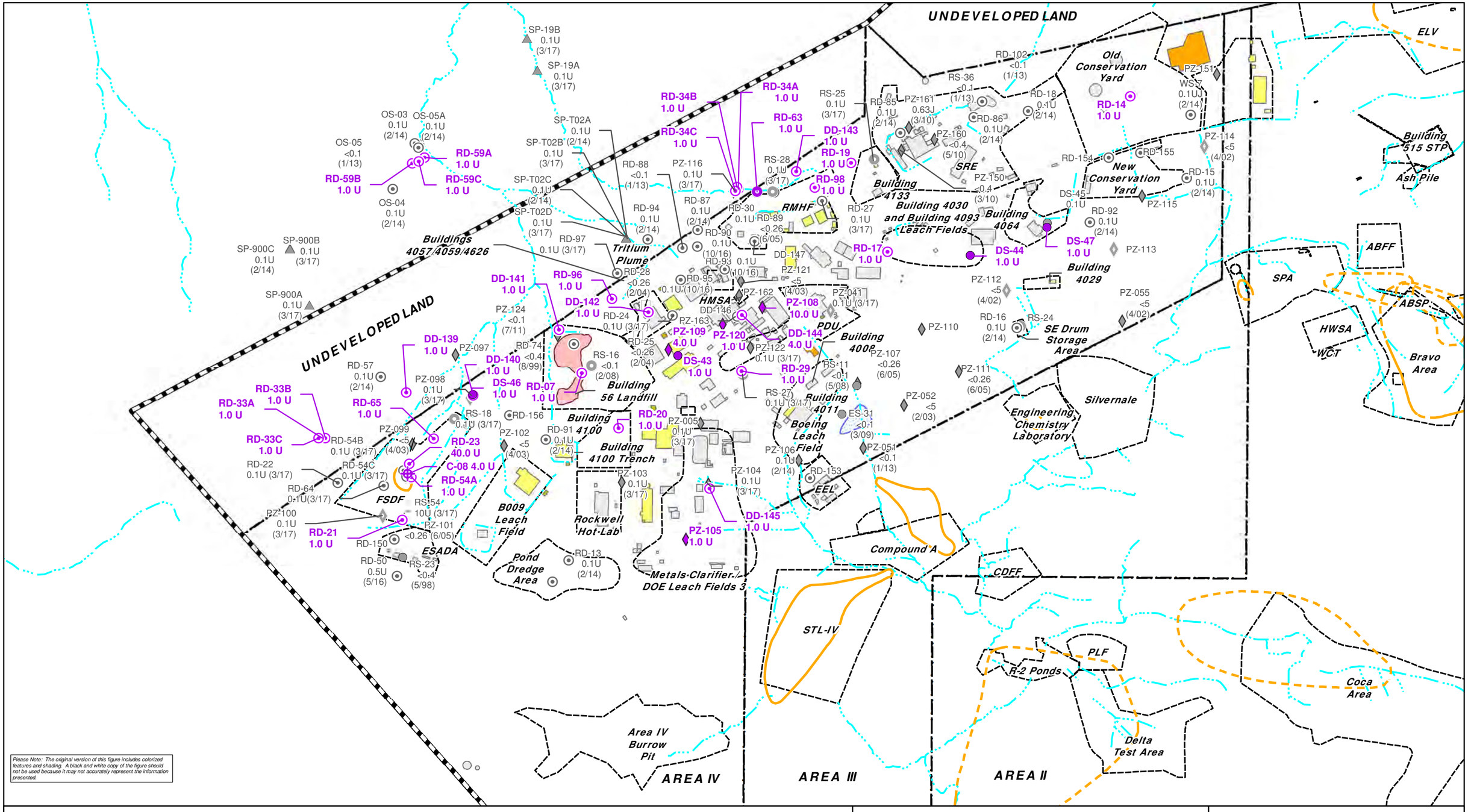
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRANS-1,2-DICHLOROETHENE IN GROUNDWATER, 2018
FIGURE 9

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 9_SSFL_2018GWAnnual_trans12DCE_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color fo 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Vinyl Chloride in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

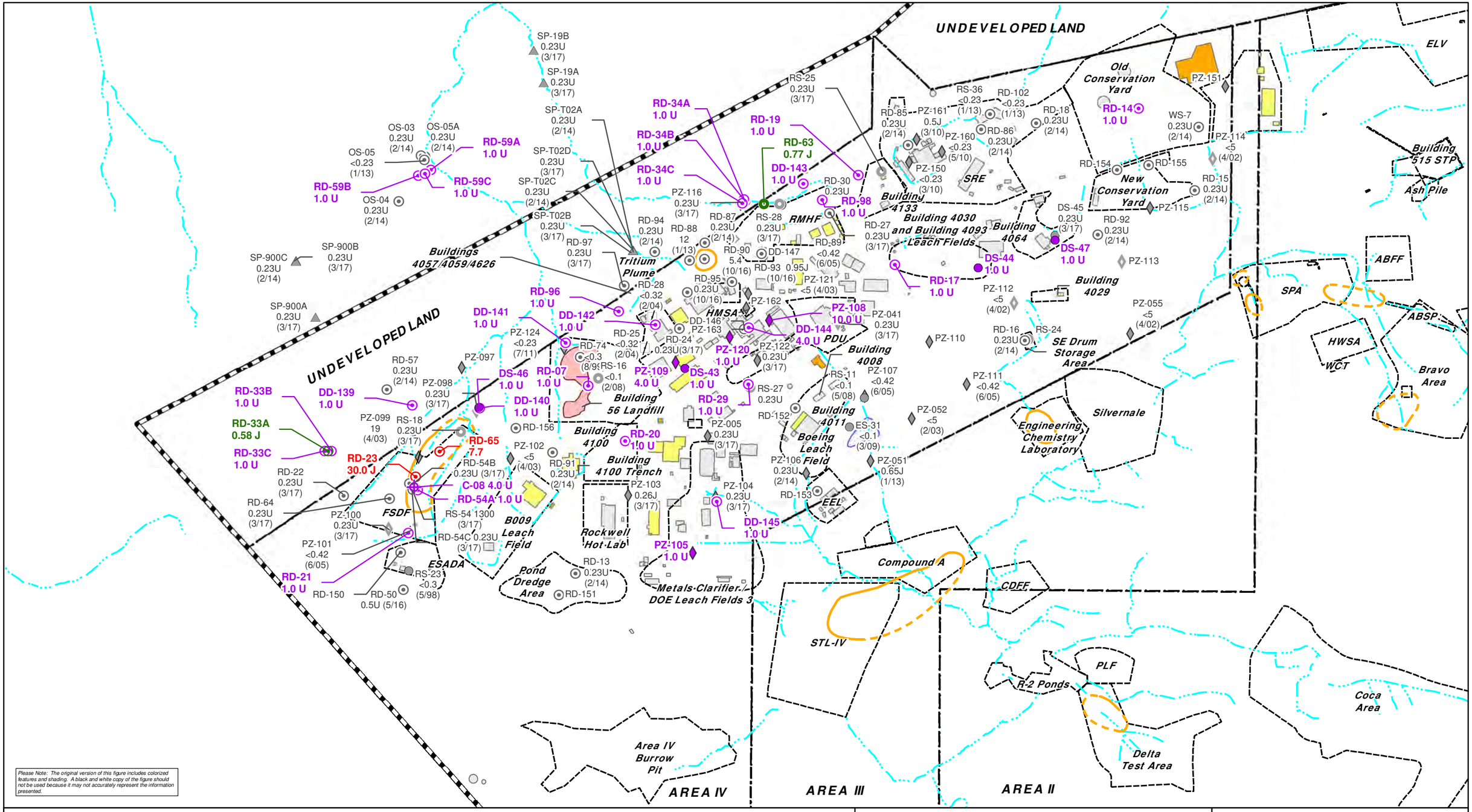
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF VINYL CHLORIDE IN GROUNDWATER, 2018
FIGURE 10

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 10_SSFL_2018GWAnnual_VinylChloride_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color fo 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- 1,1-Dichloroethene in Groundwater above Cal MCL of 6 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

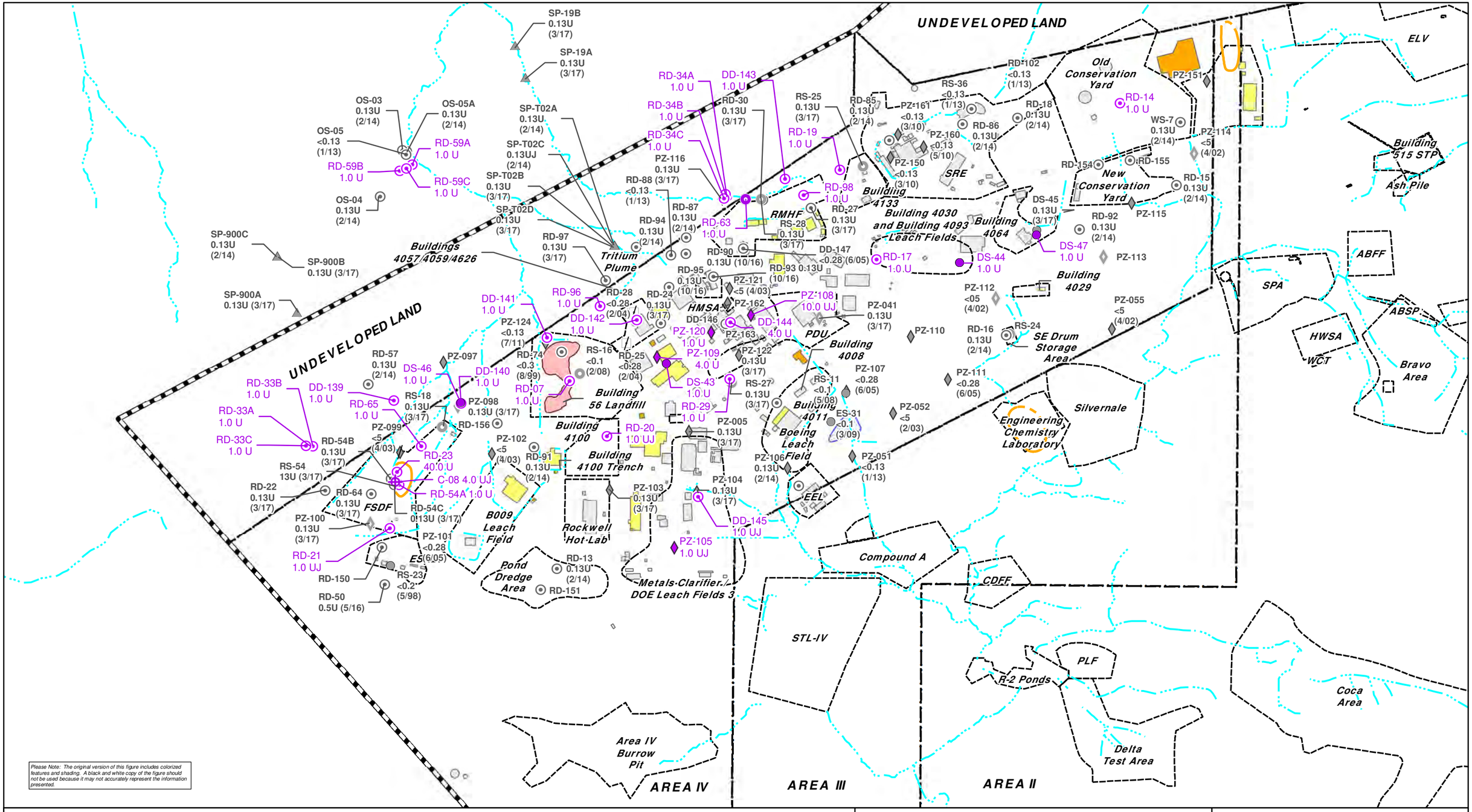
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,1-DICHLOROETHENE IN GROUNDWATER, 2018
FIGURE 11

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 11_SSFL_2018GWAnnual_11DCE_11x17.mxd



Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- 1,2-Dichloroethane in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

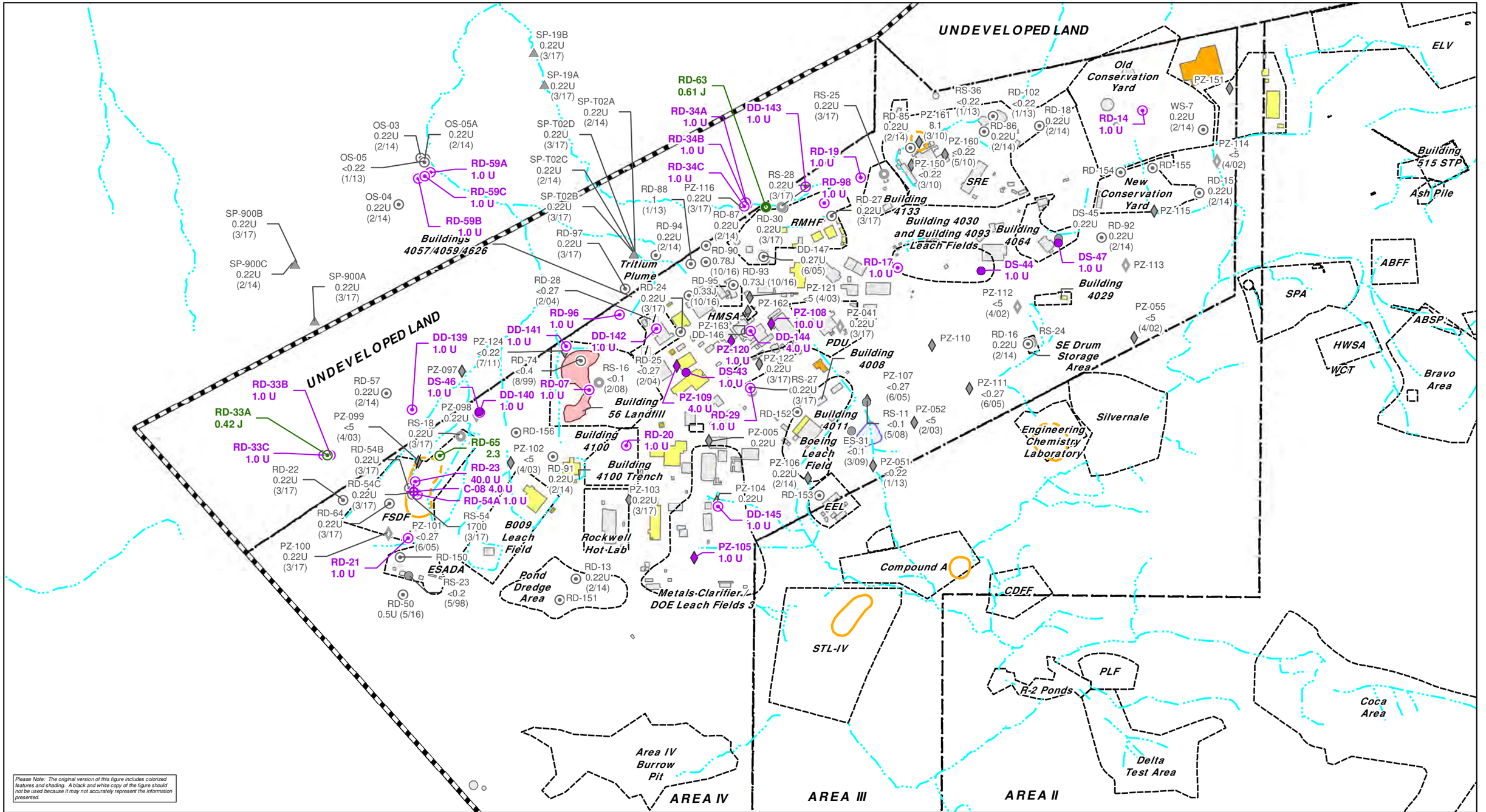
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,2-DICHLOROETHANE IN GROUNDWATER, 2018
FIGURE 12

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 12_SSFL_2018GWAnnual_12DCA_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color fo 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- 1,1-Dichloroethane in Groundwater above Cal MCL of 5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

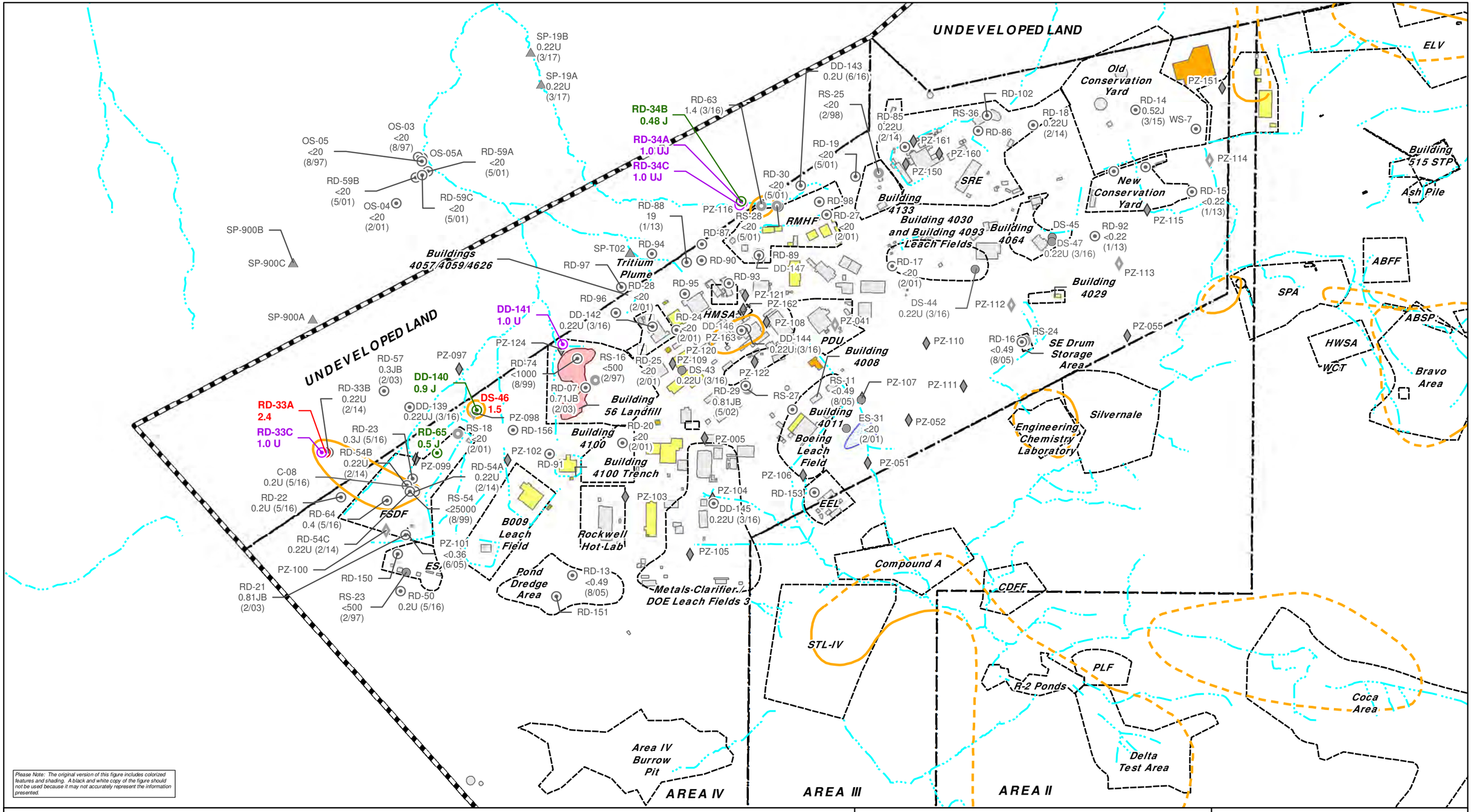
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,1-DICHLOROETHANE IN GROUNDWATER, 2018
FIGURE 13

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 13_SSFL_2018GWAnnual_11DCA_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- 1,4-Dioxane in Groundwater above Primary MCL of 1 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

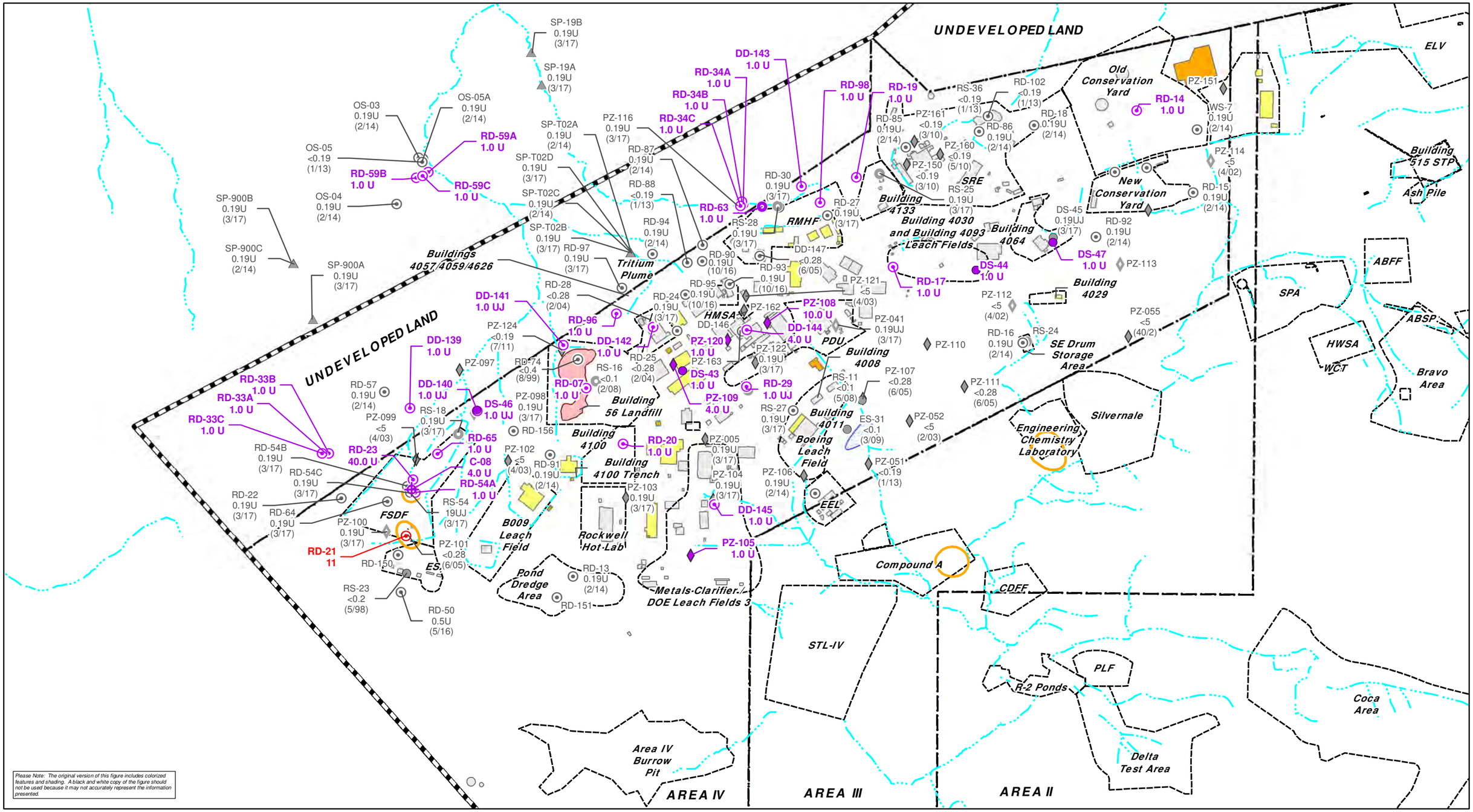
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF 1,4-DIOXANE IN GROUNDWATER, 2018
FIGURE 14

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 14_SSFL_2018GWAnnual_14Dioxane_11x17.mxd



Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Carbon Tetrachloride in Groundwater above Cal MCL of 0.5 ug/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

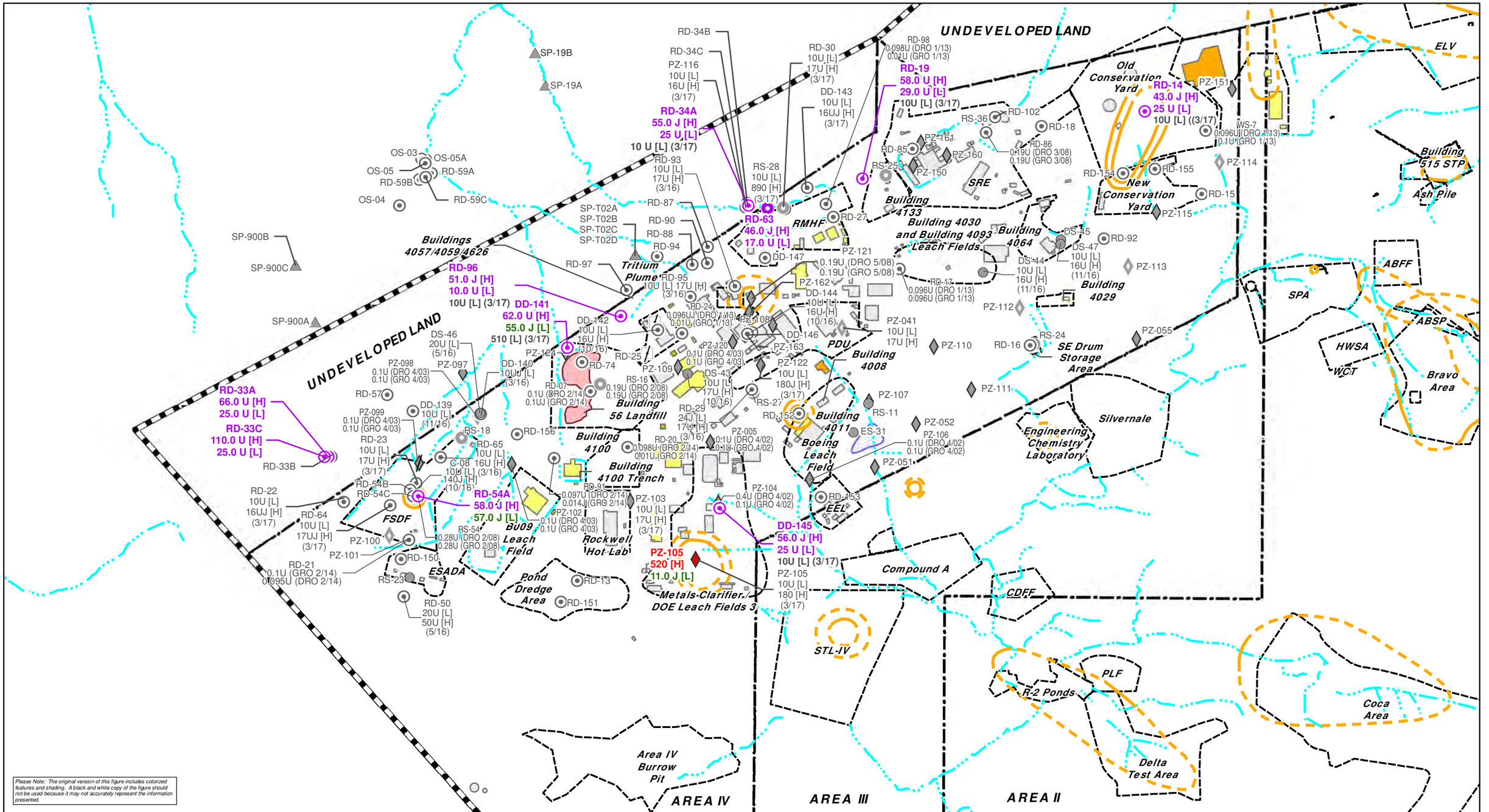
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF CARBON TETRACHLORIDE IN GROUNDWATER, 2018
FIGURE 15

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 15_SSFL_2018GWAnnual_CarbonTetrachloride_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color fo 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- TPH in Groundwater above Taste/Odor Threshold of 100 ug/L for Heavy TPH, and reporting limit of 5 ug/L for Light TPH

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in micrograms per liter (ug/L) detected in 2018 at each location. Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses. Only primary results shown. Historical TPH results are identified as GRO or DRO on the figure. For 2018, sample results have been identified as Light or Heavy in order to address the overlap in carbon ranges. The Light category consists of EFH C12-C14, EFH C8-C11, GRO C5-C12, GRO C6-C12, and GRO C6-C10. The Heavy category consists of DRO C10-C28, EFH C15-C20, EFH C21—C30, and EFH C30-C40. The GRO from the historical results is considered to be a Light TPH and the DRO is considered to be a Heavy TPH.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

1 inch = 550 feet

0 275 550 825 1,100 Feet

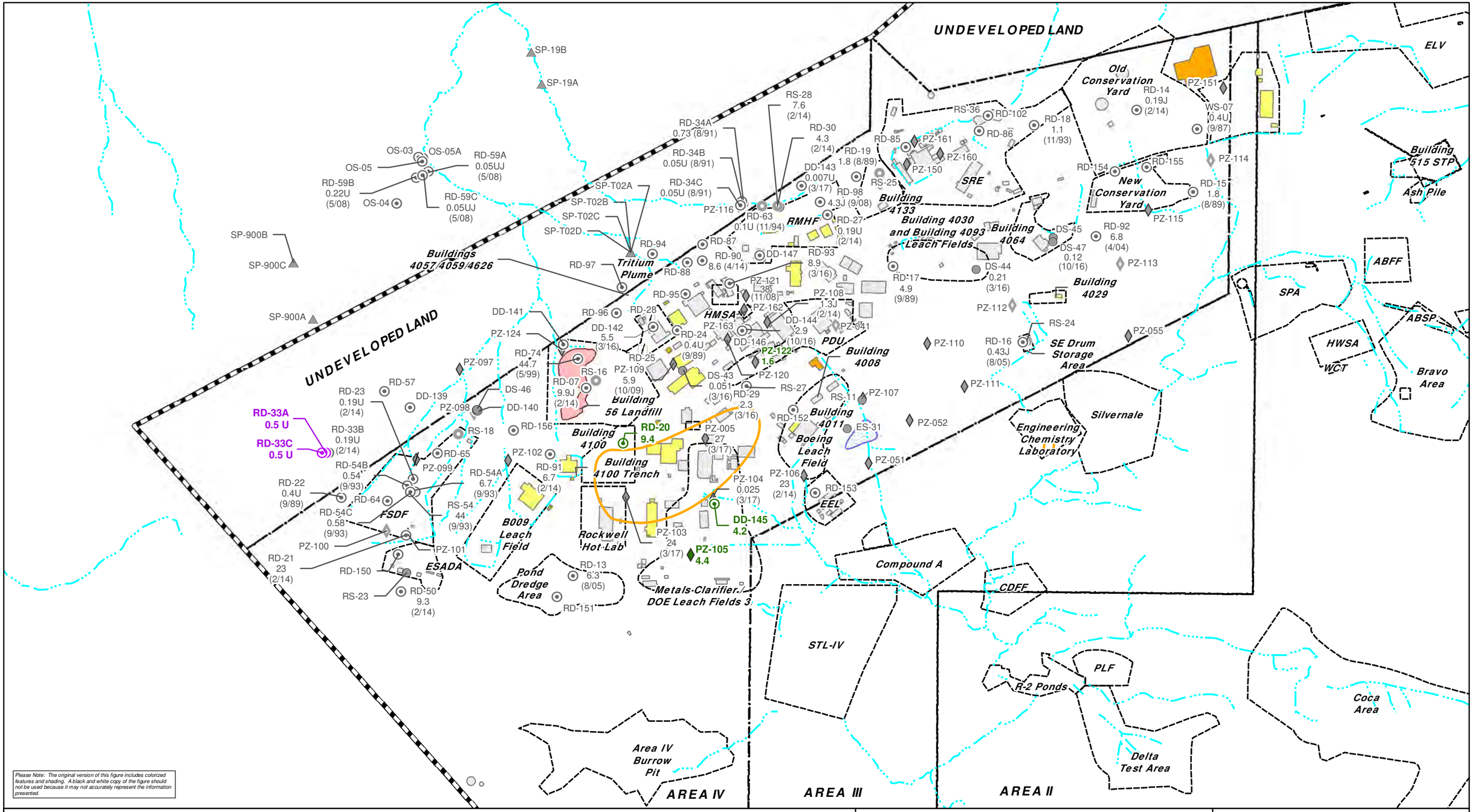
NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV

EXTENT OF TOTAL PETROLEUM HYDROCARBONS C4-C30 IN GROUNDWATER, 2018

FIGURE 16

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 16_SSFL_2018GWAnnual_TPH_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Nitrate-NO3 in Groundwater above Cal MCL of 45 mg/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smithas needed.
Values posted beneath well identifiers are maximum concentrations in milligrams per liter (mg/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

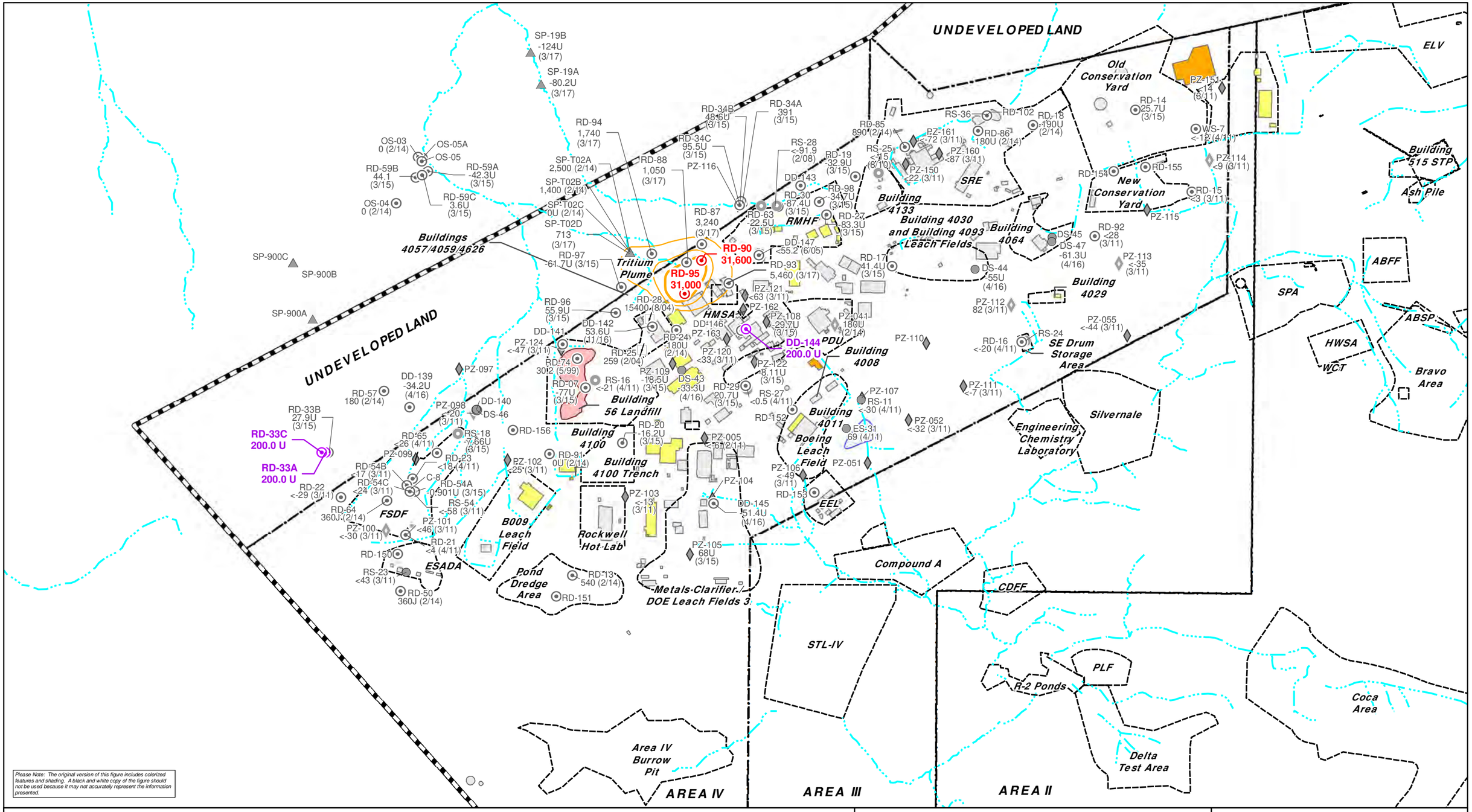
1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF NITRATE IN GROUNDWATER, 2018
FIGURE 17

\\nwindenv.com\nwi2\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 17_SSFL_2018GWAnnual_Nitrate_11x17.mxd



Please Note: The original version of this figure includes colorized features and shading. A black and white copy of the figure should not be used because it may not accurately represent the information presented.

Legend

Symbol Color for 2018 Groundwater Results

- Detected above MCL
- Detected above detection limit, below MCL
- Not detected above detection limits (ND)
- Well/Piezometer not sampled/analyzed

Areas of Impacted Groundwater

- Tritium in Groundwater above Primary MCL of 20,000 pCi/L (boundary dashed where inferred)

Well Type and Groundwater Zone

Groundwater Monitoring Wells

- Groundwater Monitoring Well, Perched
- Groundwater Monitoring Well, Near Surface
- Groundwater Monitoring Well, Chatsworth Formation

Piezometers

- Piezometer, Perched
- Piezometer, Near Surface

Seeps/Springs

- Seep/spring

Other

- Abandoned Well
- Abandoned Piezometer
- Corehole

Basemap

- Drainage
- Area IV Boundary
- SSFL Property Boundary

Structures

- Existing Landfill
- Existing Structure
- Existing Substation
- Former Pond
- Demolished Structure

Notes:
Original GIS layers provided by MWH/Boeing; updated by CDM Smith as needed.
Values posted beneath well identifiers are maximum concentrations in picocuries per liter (pCi/L) detected in 2018 at each location.
Values posted at location with no 2018 results are for the most recent analytical result with collection date shown in parentheses.
Only primary results shown.
PZ-162, PZ-163, DD-146, DD-147 are new locations for 2018

1 inch = 550 feet

0 275 550 825 1,100 Feet

NORTHWIND INC.

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
AREA IV
EXTENT OF TRITIUM IN GROUNDWATER, 2018
FIGURE 18

Q:\Greenville\gis_projects\ETEC\Project\SSFL Annual Groundwater Report\2018\Fig 18_SSFL_2018GWAnnual_Tritium_11x17.mxd

APPENDIX A
Monitoring Well and Piezometer Construction Data

Table A-1 Well Construction Data

Table A-2(A, B) Construction Details of Piezometer Monitoring System

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TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
SHALLOW WELLS										
DS-43	IV	84	14	0 - 10	6	0 - 28	0 - 28		1809.52	02/10/16
			9-7/8	10-28	---	---				
			5-7/8	28 - 84	---	---		Open Hole		
			3-11/16	84 - 93	---	---		Open Hole		
DS-44	IV	91	14	0 - 10	6	0 - 19	0 - 19		1851.21	01/20/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 91	---	---		Open Hole		
DS-45	IV	75	14	0 - 9	6	0 - 18	0 - 18		1866.58	01/28/16
			9-7/8	9 - 18	---	---				
			5-7/8	18 - 75	---	---		Open Hole		
			3-11/16	75 - 95	---	---		Open Hole		
DS-46	IV	52	14	0 - 5	6	0 - 37	0 - 37		1797.79	02/24/16
			9-7/8	5 - 37	---	---				
			5-7/8	37 - 52	---	---		Open Hole		
DS-47	IV	145	14	0 - 10	6	0 - 19	0 - 19		1867.94	03/17/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 145	---	---		Open Hole		
RS-11	IV	17.5	16	0 - 17.5	4	0 - 17.5	0 - 9	10 - 17.5	1790.39	06/10/85
RS-16	IV	20.5	16	0 - 20.5	4	0 - 20.5	0 - 14.5	16.5 - 20.5	1811.05	06/11/85
RS-18	IV	13	16	0 - 13	4	0 - 13	0 - 6	7.5 - 13	1802.86	06/12/85
RS-19	I	15	16	0 - 15	4	0 - 15	0 - 4.8	4.8 - 15	1812.42	09/12/85
RS-20	I	20.5	16	0 - 20.5	4	0 - 20.5	0 - 8.5	10.5 - 20.5	1823.77	09/12/85
RS-21	II	29	16	0 - 29	4	0 - 24.6	0 - 3.5	14.5 - 24.6	1767.36	10/23/85
RS-22	II	31	16	0 - 31	4	0 - 31	0 - 4	21 - 31	1771.23	10/23/85
RS-23	IV	13	12	0 - 13	4	0 - 13	0 - 6.8	8 - 13	1887.25	08/23/88
RS-24	IV	8.5	12	0 - 8.5	4	0 - 8.5	0 - 3	4 - 8.5	1809.24	08/25/88
RS-25	IV	13.5	Trenched	0 - 13.5	4	0 - 13.5	0 - 2	8.5 - 13.5	1862.71	08/25/88
RS-27	IV	9	8	0 - 9	4	0 - 9	0 - 3	5 - 9	1804.78	08/02/88
RS-28	IV	19	8	0 - 19	4	0 - 19	0 - 9	14 - 19	1768.59	08/17/89
RS-36	IV	19.5	9-5/8	0 - 19.5	12	0 - 15	0 - 15		1817.73	11/21/11
					9-5/8	---	---	Open Hole		
RS-54	IV	38	11-1/4	0 - 7	6-1/4	0 – 7	0 - 7		1846.66	08/09/93
			5-7/8	7 - 38	---	---		Open Hole		
ES-31	IV	25	12	0 - 25	6	0 - 25	0 - 9.7	11.6 - 25	1787.01	01/29/87
CHATSWORTH FORMATION										
DD-139	IV	206	14	0 - 10	6	0 - 19	0 - 19		1793.01	03/04/16
			9-7/8	10 - 19	---	---				
			5-7/8	19 - 206	---	---		Open Hole		
DD-140	IV	167	14	0 - 10	6	0 - 60	0 - 60		1798.16	02/23/16
			9-7/8	10 - 60	---	---				
			5-7/8	60 - 167	---	---		Open Hole		
DD-141	IV	133	14	0 - 10	6	0 - 19.5	0 - 19.5		1762.79	06/29/16
			9-7/8	10 - 19.5	---	---				
			5-7/8	19.5 -133	---	---		Open Hole		
DD-142	IV	91	14	0 - 10	6	0 - 34	0 - 34		1812.22	02/05/16
			9-7/8	10 - 34	---	---				
			5-7/8	34 - 91	---	---		Open Hole		
DD-143	IV	100	14	0 - 10	6	0 - 19.7	0 - 19.7		1789.74	06/15/16
			9-7/8	10 - 19.7	---	---				
			5-7/8	19.7 -100	---	---		Open Hole		
DD-144	IV	71	14	0 - 15	6	0 - 38	0 - 38		1810.69	02/02/16
			9-7/8	15 - 38	---	---				
			5-7/8	38 - 71	---	---		Open Hole		

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
DD-145	IV	82	14 9-7/8 5-7/8	0 - 3 3 - 27 27 - 82	6 --- ---	0 - 27 --- ---	0 - 27	 Open Hole	1798.90	02/12/16
DD-146	IV	140	10 5-7/8	0 - 40 40 - 140	6 ---	0 - 120 ---	0 - 120	 Open Hole	1818.08	06/14/18
DD-147	IV	257	13 5-7/8	0 - 30 30 - 257	8.5 ---	0 - 30 ---	0 - 30	 Open Hole	1802.96	06/14/18
RD-07	IV	300	15 8-5/8	0 - 25 25 - 300	10-1/8 ---	0 - 25 ---	0 - 25	 Open Hole	1812.82	01/08/86
RD-13	IV	160	12 6-1/2	0 - 30 30 - 160	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1840.01	07/25/89
RD-14	IV	125	12 6-1/2	0 - 30 30 - 125	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1824.18	07/27/89
RD-15	IV	152	12 6-1/2	0 - 30 30 - 152	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1817.70	07/27/89
RD-16	IV	220	12 6-1/2	0 - 30 30 - 220	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1808.99	08/15/89
RD-17	IV	125	12 6-1/2	0 - 30 30 - 125	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1836.30	08/10/89
RD-18	IV	240	12 6-1/2	0 - 30 30 - 240	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1839.51	07/28/89
RD-19	IV	135	12 6-1/2	0 - 30 30 - 135	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1853.16	07/31/89
RD-20	IV	127	12 6-1/2	0 - 30 30 - 127	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1819.52	07/27/89
RD-21	IV	175	12 6-1/2	0 - 30 30 - 175	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1866.96	08/11/89
RD-22	IV	440	12 6-1/2	0 - 30 30 - 440	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1853.41	08/15/89
RD-23	IV	440	12 6-1/2	0 - 30 30 - 440	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1838.19	08/16/89
RD-24	IV	150	12 6-1/2	0 - 30 30 - 150	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1809.93	08/09/89
RD-25	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-27	IV	150	12 6-1/2	0 - 30 30 - 150	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1841.67	08/10/89
RD-28	IV	Well abandoned April 2004 as part of Building 4059 demolition.								
RD-29	IV	100	12 6-1/2	0 - 30 30 - 100	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1806.29	08/10/89
RD-30	IV	75	12 6-1/2	0 - 30 30 - 75	8-1/4 ---	0 - 30 ---	0 - 30	 Open Hole	1768.69	08/11/89
RD-33A	UL-N	320	17-1/2 11 5-1/2	0 - 11 11 - 100 100 - 320	12-1/8 6-1/4 ---	0 - 11 0 - 100 ---	0 - 11 0 - 100	 Open Hole	1792.97	09/27/91
RD-33B	UL-N	415	17-1/2 11 6-1/4	0 - 20 20 - 360 360 - 415	12-1/8 6-1/4 ---	0 - 20 0 - 360 ---	0 - 20 20 - 360	 Open Hole	1793.72	09/27/91
RD-33C	UL-N	520	17-1/2 11 6-1/4	0 - 10 10 - 480 480 - 520	12-1/8 6-1/4 ---	0 - 10 0 - 480 ---	0 - 10 0 - 480	 Open Hole	1793.61	09/21/91
RD-34A	UL-N	60	12-1/4 6-1/2	0 - 16 16 - 60	8-1/4 ---	0 - 16 ---	0 - 16	 Open Hole	1761.91	07/25/91
RD-34B	UL-N	240	17-1/2 11 6-1/4	0 - 30 30 - 180 180 - 240	12-1/8 6-1/4 ---	0 - 30 0 - 180 ---	0 - 30 0 - 180	 Open Hole	1762.51	08/11/91

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
RD-34C	UL-N	450	17-1/2 11 6-1/4	0 - 30 30 - 380 380 - 450	12-1/8 6-1/4 ---	0 - 30 0 - 380 ---	0 - 30 0 - 380	Open Hole	1762.79	08/10/91
RD-50	IV	195	12-3/4 6-1/4	0 - 18.5 18.5 - 195	8-1/4 ---	0 - 18.5 ---	0 - 18.5	Open Hole	1914.88	05/28/93
RD-54A	IV	278	17-1/2 11-1/4 5-7/8	0 - 19 19 - 119 119 - 278	12-1/8 6-1/4 ---	0 - 19 0 - 119 ---	0 - 19 0 - 119	Open Hole	1841.72	08/07/93
RD-54B	IV	437	17-1/2 11-1/4 5-7/8	0 - 19 19 - 379 379 - 437	12-1/8 6-1/4 ---	0 - 19 0 - 379 ---	0 - 19 0 - 379	Open Hole	1842.54	08/31/93
RD-54C	IV	638	17-1/2 11-1/4 6-1/4	0 - 20 20 - 558 558 - 638	12-1/8 6-1/4 ---	0 - 20 0 - 557 ---	0 - 20 0 - 557	Open Hole	1843.77	07/27/93
RD-57	UL-N	419	17-1/2 6-1/2	0 - 19.5 19.5 - 419	12-1/8 ---	0 - 19.5 ---	0 - 19.5	Open Hole	1774.15	02/23/94
RD-59A	OS	58	17-1/2 6-1/2	0 - 21 21 - 58	12-1/8 ---	0 - 21 ---	0 - 21	Open Hole	1340.59	05/19/94
RD-59B	OS	214	17-1/2 6-1/2	0 - 19.5 19.5 - 214	12-1/8 2	0 - 19.5 0 - 209	0 - 19.5 0 - 161	178 - 209	1342.49	07/02/94
RD-59C	OS	398	17-1/2 6-1/2	0 - 19 19 - 398	12-1/8 2	0 - 19 0 - 397	0 - 19 0 - 186 250 - 328	345.5 - 397	1345.41	07/02/94
RD-63	IV	230	12-3/4 6-1/2	0 - 20 20 - 230	8-1/4 ---	0 - 20 ---	0 - 20	Open Hole	1764.83	05/10/94
RD-64	IV	398	12-1/4 6-1/2	0 - 19 19 - 398	8-1/4 ---	0 - 19 ---	0 - 19	Open Hole	1857.04	05/19/94
RD-65	IV	397	12-3/4 6-1/2	0 - 19 19 - 397	8-1/4 ---	0 - 19 ---	0 - 19	Open Hole	1819.14	08/14/94
RD-74	IV	101	17-1/2 6-1/2	0 - 30 30 - 101	12 ---	0 - 30 ---	0 - 30	Open Hole	1810.90	01/21/99
RD-85	IV	90	13-3/8 5	0 - 20 20 - 90	8 ---	0 - 20 ---	0 - 20	Open Hole	1849.36	08/04/04
RD-86	IV	80	13-3/8 5	0 - 20 20 - 80	8 ---	0 - 20 ---	0 - 20	Open Hole	1832.16	08/09/04
RD-87	IV	60	13-3/8 5	0 - 20 20 - 60	8 ---	0 - 20 ---	0 - 20	Open Hole	1789.09	08/11/04
RD-88	IV	30	13-3/8 5	0 - 20 20 - 30	8 ---	0 - 20 ---	0 - 20	Open Hole	1774.62	08/16/04
RD-89	IV	50	13 3.8	0 - 30 30 - 50	8 ---	0 - 30 ---	0 - 30	Open Hole	1814.18	05/18/05
RD-90	IV	125	12-3/4 6	0 - 20 20 - 125	8 ---	0 - 20 ---	0 - 20	Open Hole	1784.75	03/11/04
RD-91	IV	140	12-3/4 6	0 - 20 20 - 140	8 ---	0 - 20 ---	0 - 20	Open Hole	1818.04	03/12/04
RD-92	IV	105	12-3/4 6	0 - 20 20 - 105	8 ---	0 - 20 ---	0 - 20	Open Hole	1833.74	03/16/04
RD-93	IV	60	13 3.8	0 - 20 20 - 60	8 ---	0 - 20 ---	0 - 20	Open Hole	1810.48	05/19/05
RD-94	UL, NW of IV	35	13 3.8	0 - 20.5 20.5 - 35	8 ---	0 - 20.5 ---	0 - 20.5	Open Hole	1744.38	05/15/05
RD-95	IV	80	13 3.8	0 - 50 50 - 80	8 ---	0 - 50 ---	0 - 50	Open Hole	1811.36	05/12/05

TABLE A-1
WELL CONSTRUCTION DATA
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well Identifier	Area No.	Effective Borehole Depth (feet)	Borehole		Casing		Sealed Interval (feet)	Perforated Interval (feet)	Measuring Point Elevation (ft MSL)	Date Drilling Completed
			Diameter (inches)	Interval (feet)	Inside Diameter (inches)	Interval (feet)				
RD-96	IV	90	13 4	0 - 20 20 - 90	8 ---	0 - 20 ---	0 - 20	 Open Hole	1805.49	05/03/06
RD-97	UL, NW of IV	74.5	13 4	0 - 20 20 - 74.5	8 ---	0 - 20 ---	0 - 20	 Open Hole	1792.22	04/28/06
RD-98	IV	65	13-3/8 5-1/2	0 - 20 20 - 65	8-1/8 ---	0 - 20 ---	0 - 20 ---	 Open hole	1808.73	06/04/08
RD-102	IV	100	10-5/8 4	0 - 30 30 - 100	6 ---	0 - 30 ---	0 - 30 ---	 Open hole	1817.50	11/16/11
RD-150	IV	170	10 5.5	0-40 40-170	6 ---	0-40 ---	0-40	 Open Hole	1877.64	04/26/16
RD-151	IV	130	10 5.5	0-40 40-130	6 ---	0-40 ---	0-40	 Open Hole	1858.38	05/09/16
RD-152	IV	60	10 5.5	0-20 20-60	6 ---	0-20 ---	0-20	 Open Hole	1798.88	04/29/16
RD-153	IV	55	10 5.5	0-20 20-55	6 ---	0-20 ---	0-20	 Open Hole	1776.26	05/11/16
RD-154	IV	145	10 5.5	0-40 40-145	6 ---	0-40 ---	0-40	 Open Hole	1827.62	05/23/16
RD-155	IV	115	10 5.5	0-40 40-115	6 ---	0-40 ---	0-40	 Open Hole	1820.72	05/17/16
RD-156	IV	170	10 5.5	0-40 40-170	6 ---	0-40 ---	0-40	 Open Hole	1819.88	06/09/16
WS-07	IV	700	15 10	0 - 400 400 - 700	12-1/8 ---	0 - 400 ---	Unknown	216 - 400 Open Hole	1826.19	1954
PRIVATE OFF-SITE WELLS AND SPRINGS										
OS-02	OS	700	Unknown	Unknown	10 ---	0 - 17 ---	0 - 17	 Open Hole	1237.01	03/18/59
OS-03	OS	100	Drilled with cable tools		8-1/4 ---	0 - 59 ---	0 - 30	30 - 60 Open Hole	1298.15	06/12/50
OS-04	OS	Well Construction Data Unresolved or Not Available							1334.00	
OS-05	OS	Well Construction Data Unresolved or Not Available								

Notes and Abbreviations:

Depth/intervals are measured in feet below land surface.

OS	Off-site	---	No casing installed over the borehole interval specified; open hole
UL-N	Undeveloped land in northern part of Facility	(v)	Top of well below land surface, installed inside zero-grade vault
UL-S	Undeveloped land in southern part of Facility	(WB)	Well completed with Westbay Multilevel System

TABLE A-2b
CONSTRUCTION DETAILS OF PIEZOMETER MONITORING SYSTEMS
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Well ID	Northing (feet)	Easting (feet)	Surface Elevation (feet amsl)	TOC Elevation (feet amsl)	Depth to Screen Top (feet bgs)	Depth to Screen Bottom (feet bgs)	Total Depth (feet bgs)	Total Depth Drilled (feet bgs)	Borehole Diameter (inches)	Casing Diameter (inches)	Screen Material	Screen Slot Size (inches)	Casing Material	Filter Pack Grade	Filter Pack Top (feet bgs)	Filter Pack Bottom (feet bgs)	Drilling Method	Driller	Annular Seal Material	Annular Seal Top (feet bgs)	Annular Seal Bottom (feet bgs)	Wellhead Completion
PZ-150	268281.654	1786086.776	1849.92	1852.23	17.5	27.5	27.5	27.5	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	14.5	27.5	Air Rotary	WDC	Cement-Bentonite Grout	11	14.5	Monument
PZ-151	268743.1285	1787988.758	1860.4	1862.60	69.5	79.5	80	82	8	2	SCH40 PVC	0.02	SCH40 PVC	#3	64	80	CME-85 HSA/HQ w/carbide bit	WDC	Cement-Bentonite Grout Bentonite chips # 60 Sand Bentonite chips	2 52 62 80	52 62 64 82	Monument
PZ-160	268345.039	1786286.124	1849.14	1851.41	17.0	27.0	27	27	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	14	27	Air Rotary	WDC	Cement-Bentonite Grout	1	14	Monument
PZ-161	268418.806	1786132.353	1850.00	1852.23	18	28	28	28	10 5/8	4	SCH40 PVC	0.020	SCH40 PVC	#3	15	28	Air Rotary	WDC	Cement-Bentonite Grout	1	15	Monument
PZ-162	267406.770	1785109.590	1818.61	NM	31	41	41	41.8	8	2	SCH40 PVC	0.020	SCH40 PVC	#3	27	41	HSA		Cement-Bentonite Grout	1	27.5	Monument
PZ-163	267277.940	1785109.590	1817.63	NM	30	30	40	40	8	4	SCH40 PVC	0.020	SCH40 PVC	#3	27.5	40	HSA		Cement-Bentonite Grout	1	27	Monument

Notes and Abbreviations:

Northing and Easting Coordinates are in State Plane NAD 27, US Feet, with the exception of PZ-162 and PZ-163 are NAD83
amsl - above mean sea level
bgs - below ground surface
SCH - schedule
PVC - polyvinyl chloride
TOC - top of casing
NM -not measured

APPENDIX B
Precipitation Data

Table B-1 Summary of Annual Rainfall Measured at the Santa Susana Field Laboratory

Figure B-1 Annual Precipitation at SSFL, 1960 through 2017

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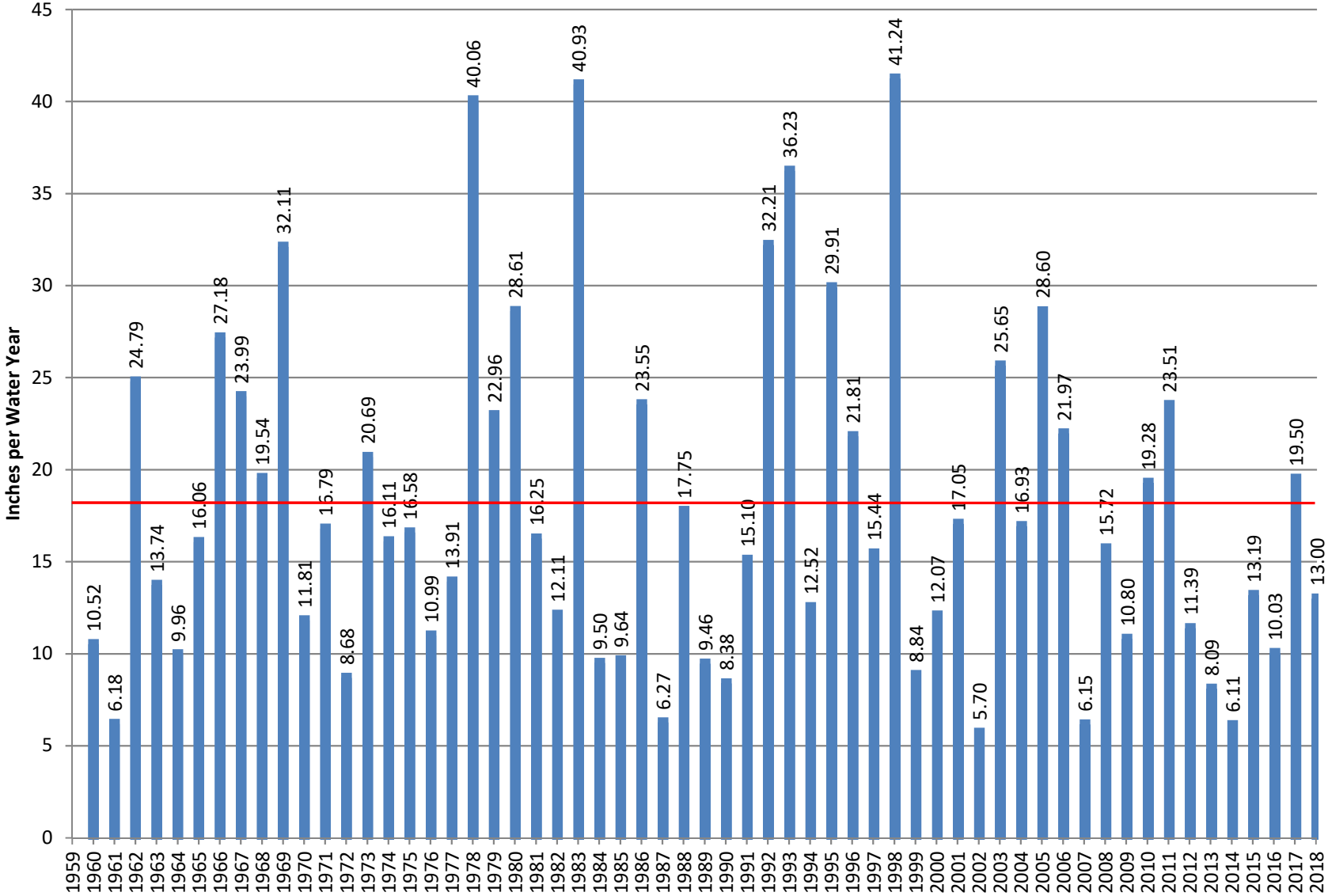
TABLE B-1
SUMMARY OF ANNUAL RAINFALL
MEASURED AT THE SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

Water Year Ending in	Precipitation (inches)	Water Year Ending in	Precipitation (inches)
1960	10.52	1990	8.38
1961	6.18	1991	15.10
1962	24.79	1992	32.21
1963	13.74	1993	36.23
1964	9.96	1994	12.52
1965	16.06	1995	29.91
1966	27.18	1996	21.81
1967	23.99	1997	15.44
1968	19.54	1998	41.24
1969	32.11	1999	8.84
1970	11.81	2000	12.07
1971	16.79	2001	17.05
1972	8.68	2002	5.70
1973	20.69	2003	25.65
1974	16.11	2004	16.93
1975	16.58	2005	28.60
1976	10.99	2006	21.97
1977	13.91	2007	6.15
1978	40.06	2008	15.72
1979	22.96	2009	10.80
1980	28.61	2010	19.28
1981	16.25	2011	23.51
1982	12.11	2012	11.39
1983	40.93	2013	8.09
1984	9.50	2014	6.11
1985	9.64	2015	13.19
1986	23.55	2016	10.03
1987	6.27	2017	19.50
1988	17.75	2018	13.00
1989	9.46		
Average Annual Precipitation (1960-2018) =			**17.68**

NOTE: Precipitation reported annually for the period of October through September of the calendar year indicated.

Figure B-1
Annual Precipitation at the SSFL, 1960 through 2018



APPENDIX C
Water Level Hydrographs

List of Hydrographs

FSDF/ESADA
RD-21
RS-54

B4100 Trench
RD-20

Bldg 56 Landfill
RD-07

B4057/59/626
PZ-109

HMSA/PDU
PZ-120
RD-29

Tritium Plume
RD-90
RD-95

RMHF
RD-30
RD-63

OCY
RD-14

Bldg 65 Metals Clarifier
PZ-104
PZ-105

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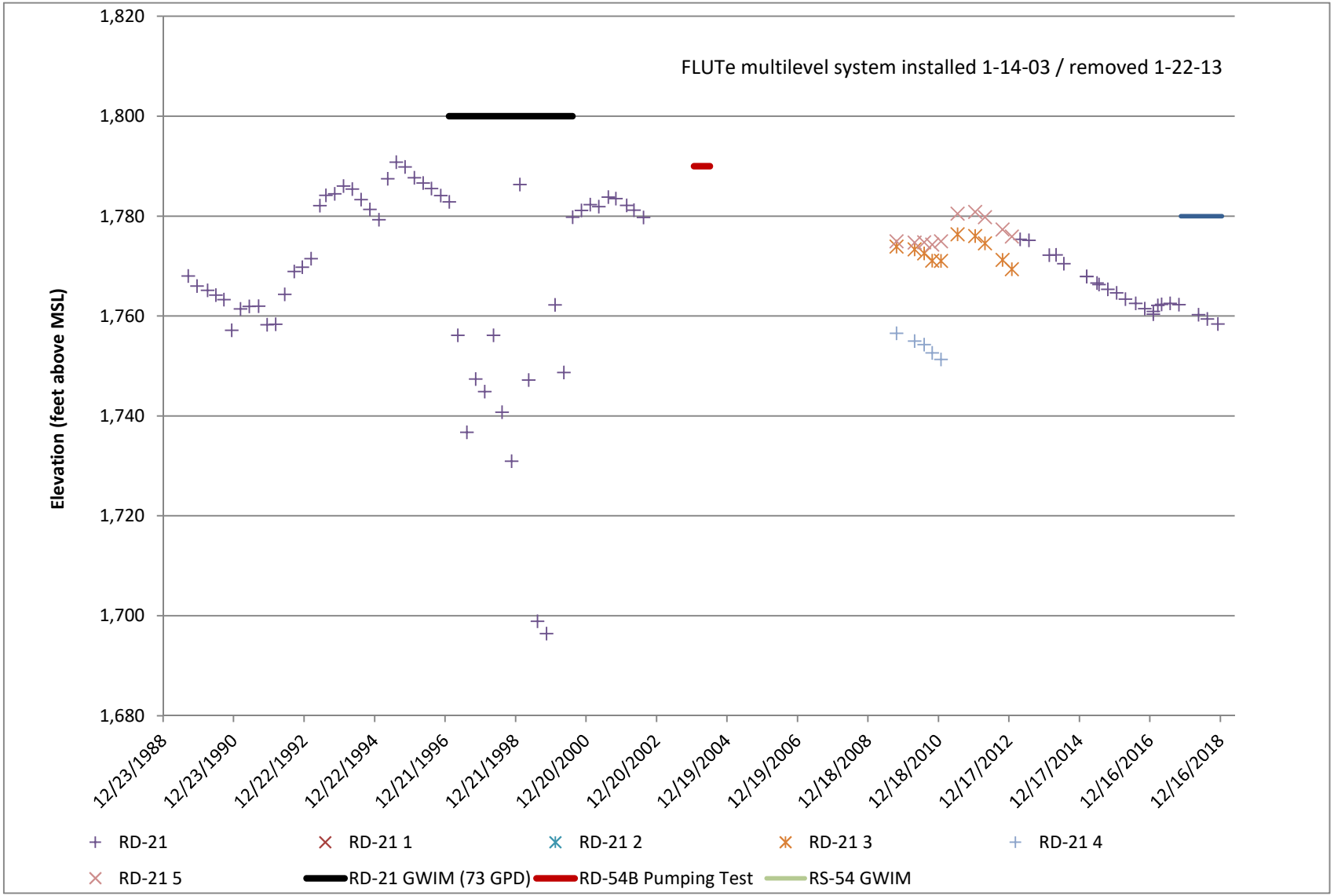
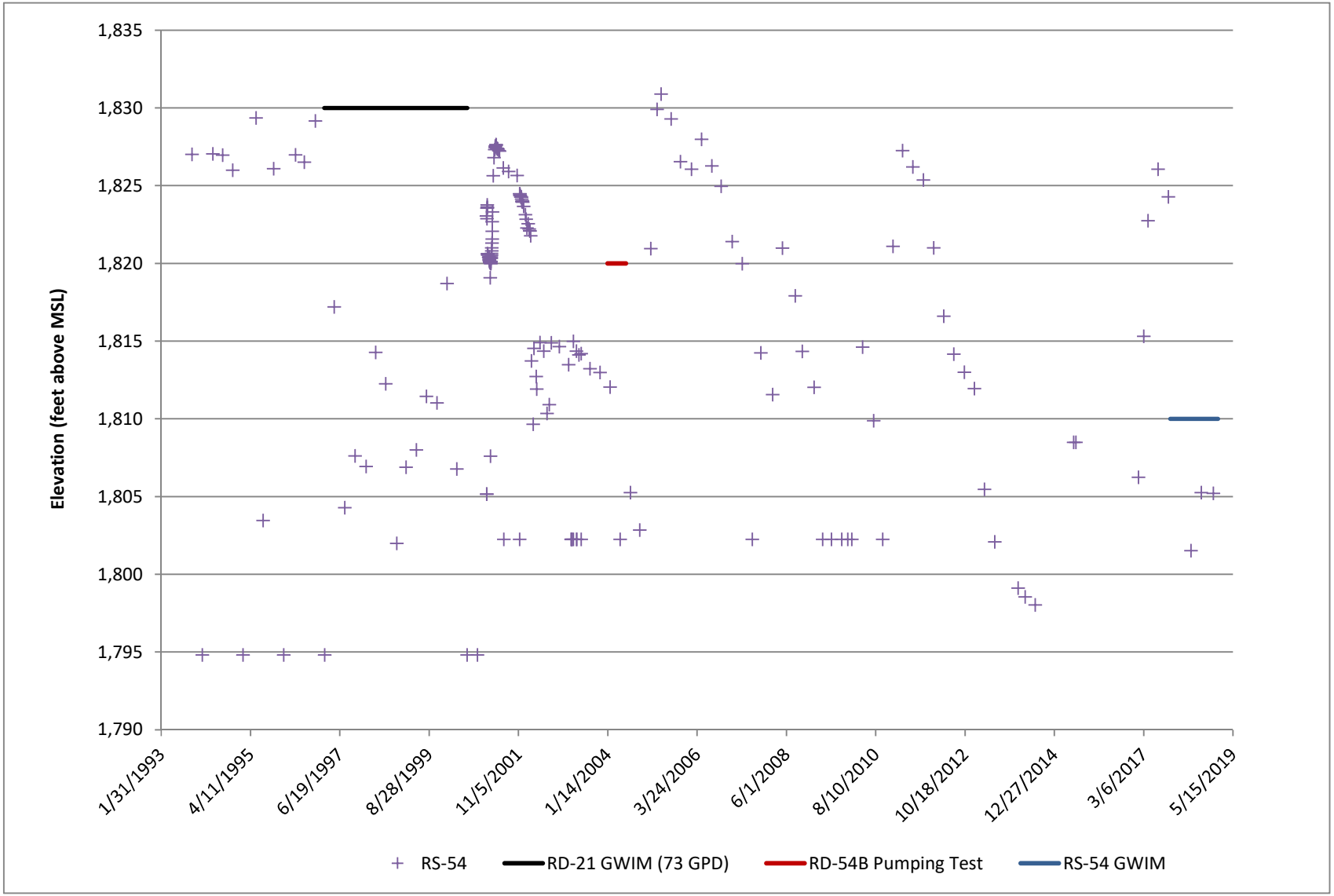
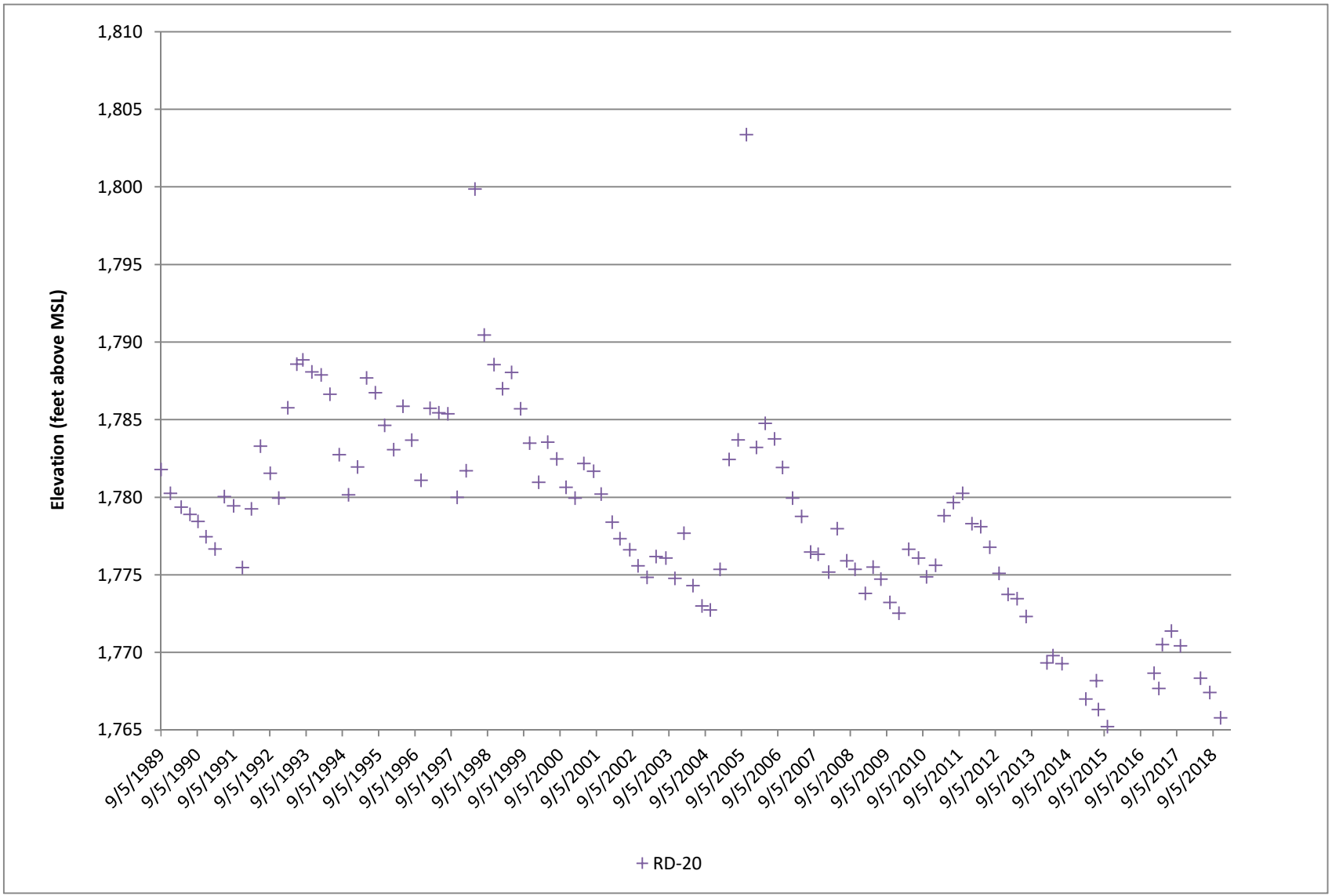
RD-21, FSDF
Hydrograph



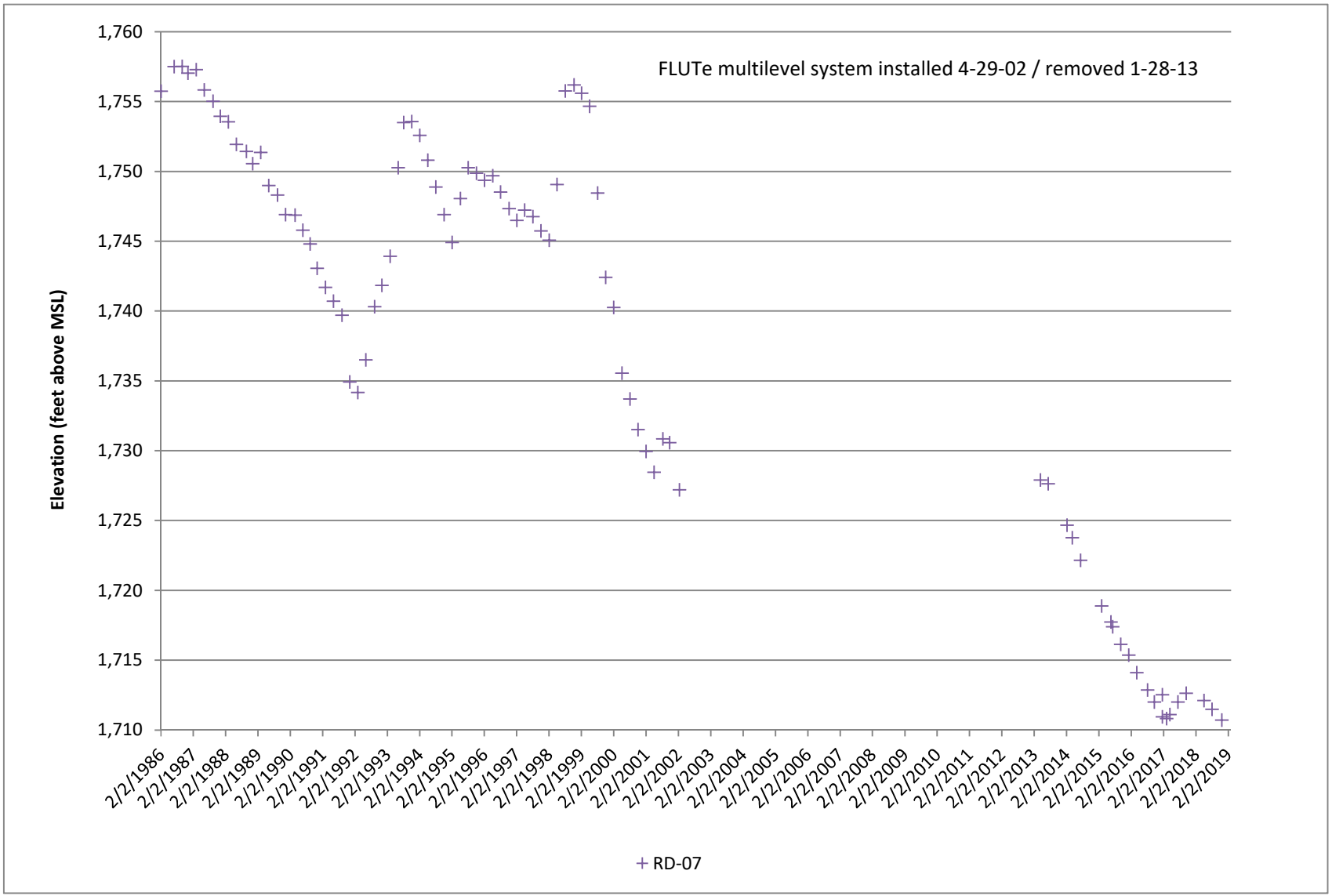
RS-54, FSDF
Hydrograph



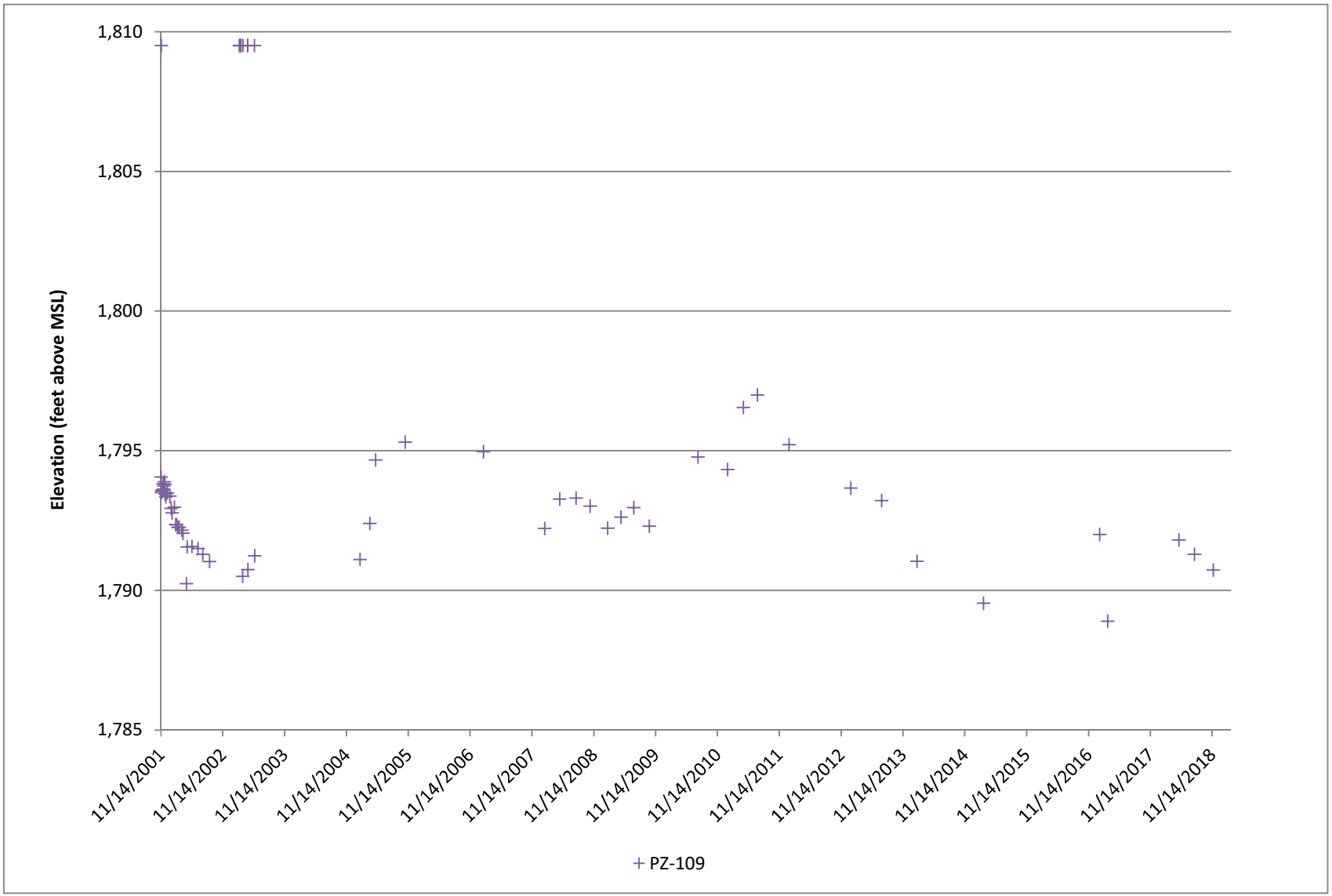
RD-20, B4100 Trench
Hydrograph



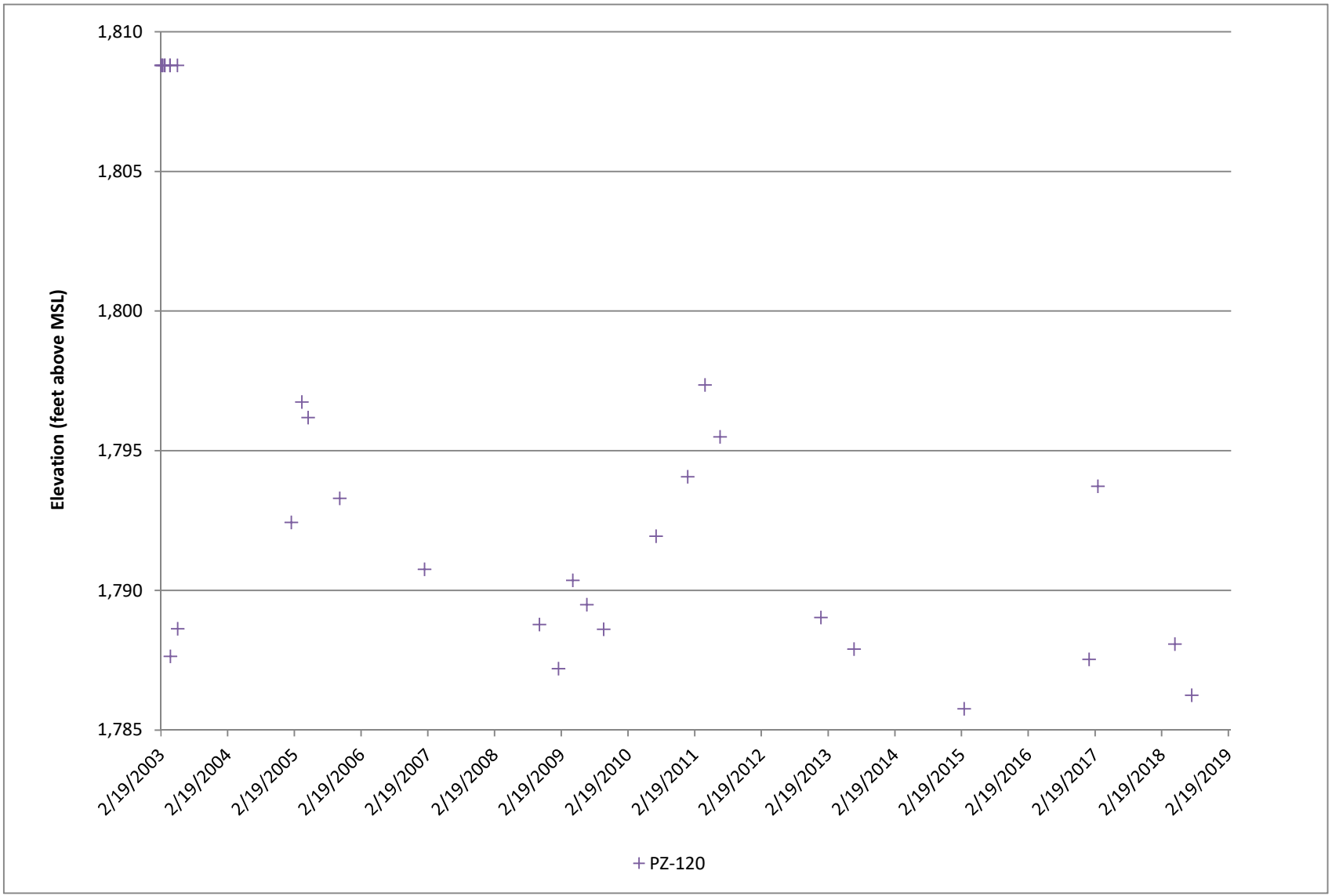
RD-07, Bldg 56 Landfill
Hydrograph



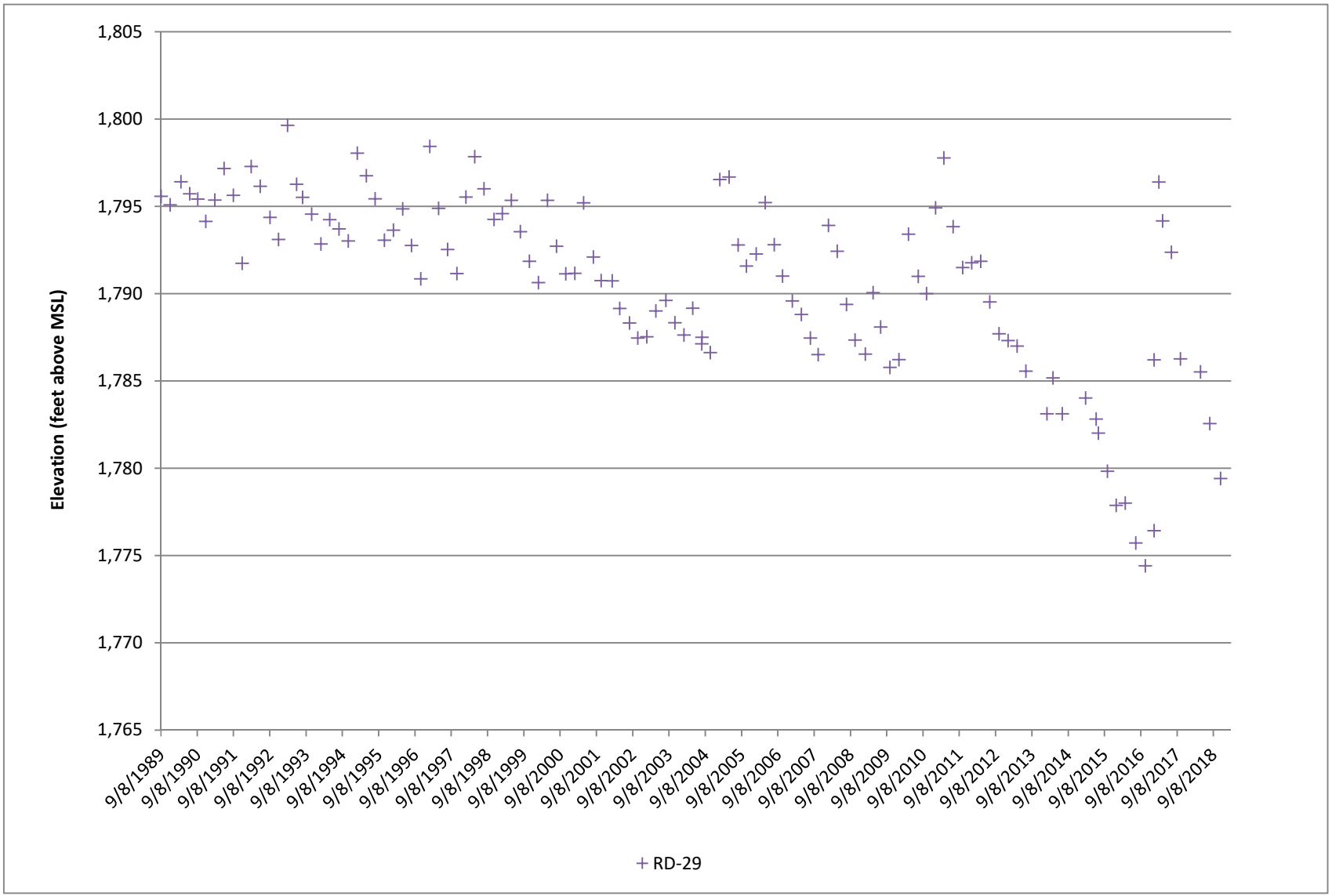
PZ-109, B4057/4059/4626
Hydrograph



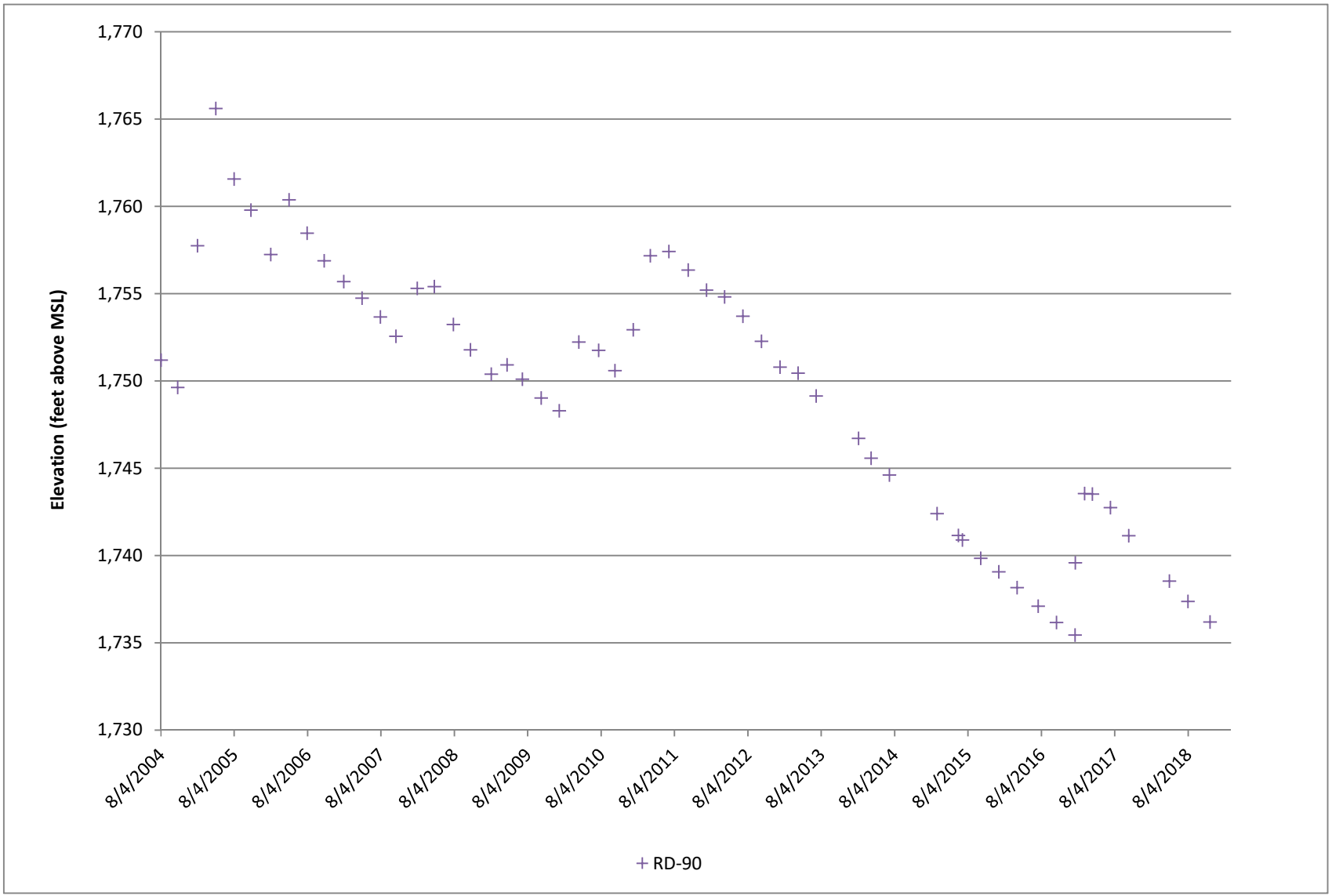
PZ-120, HMSA
Hydrograph



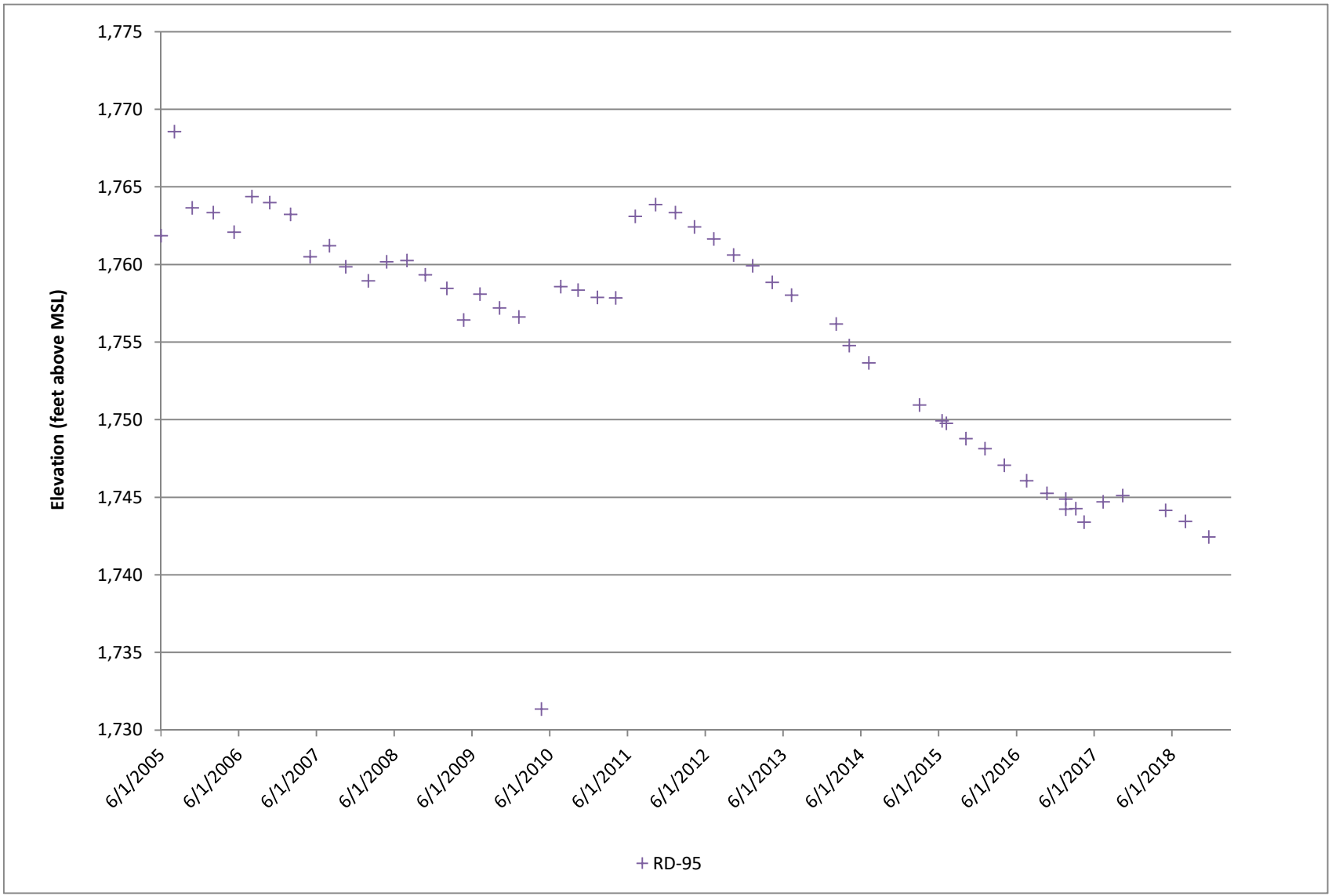
RD-29, HMSA
Hydrograph



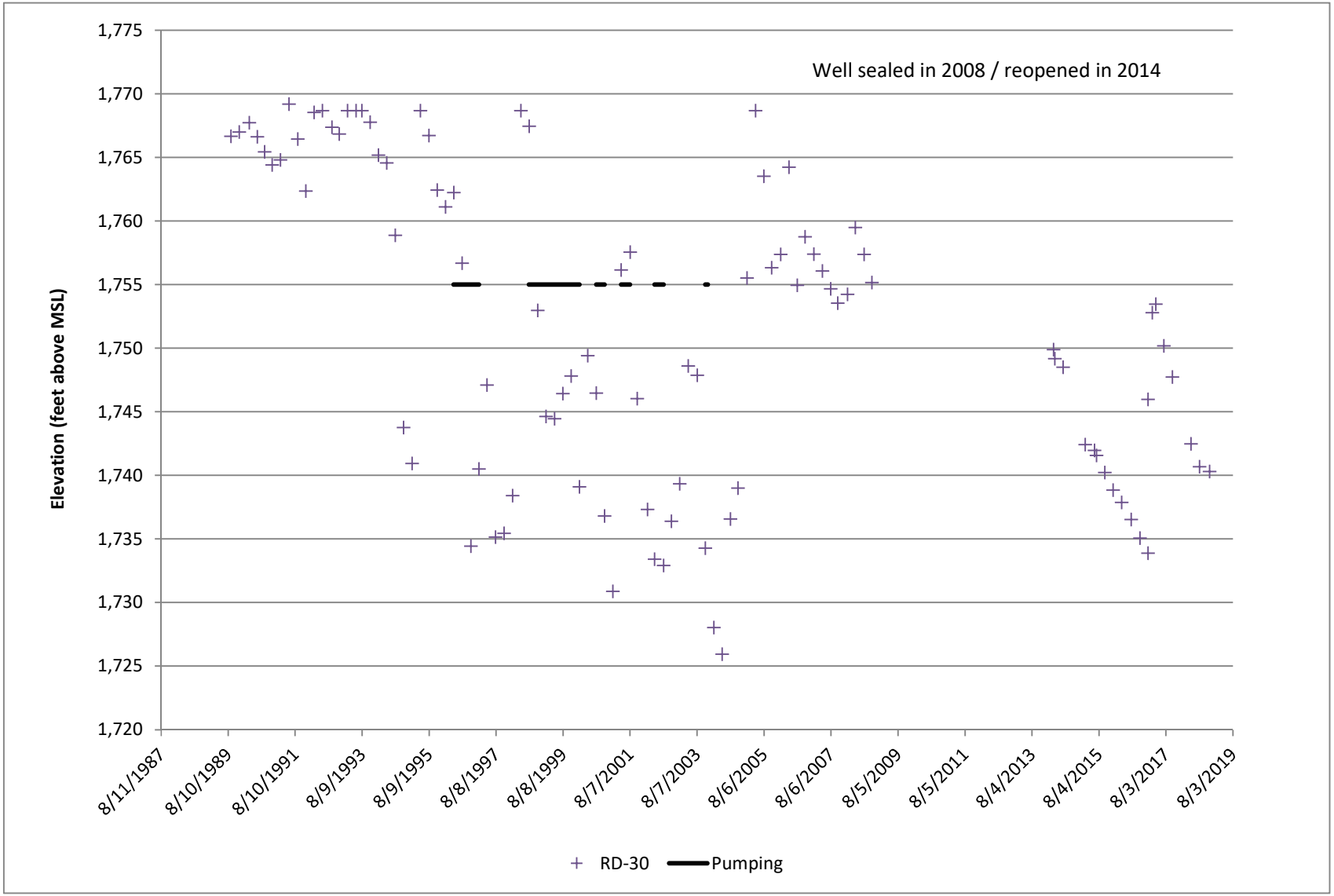
RD-90, Tritium Plume
Hydrograph



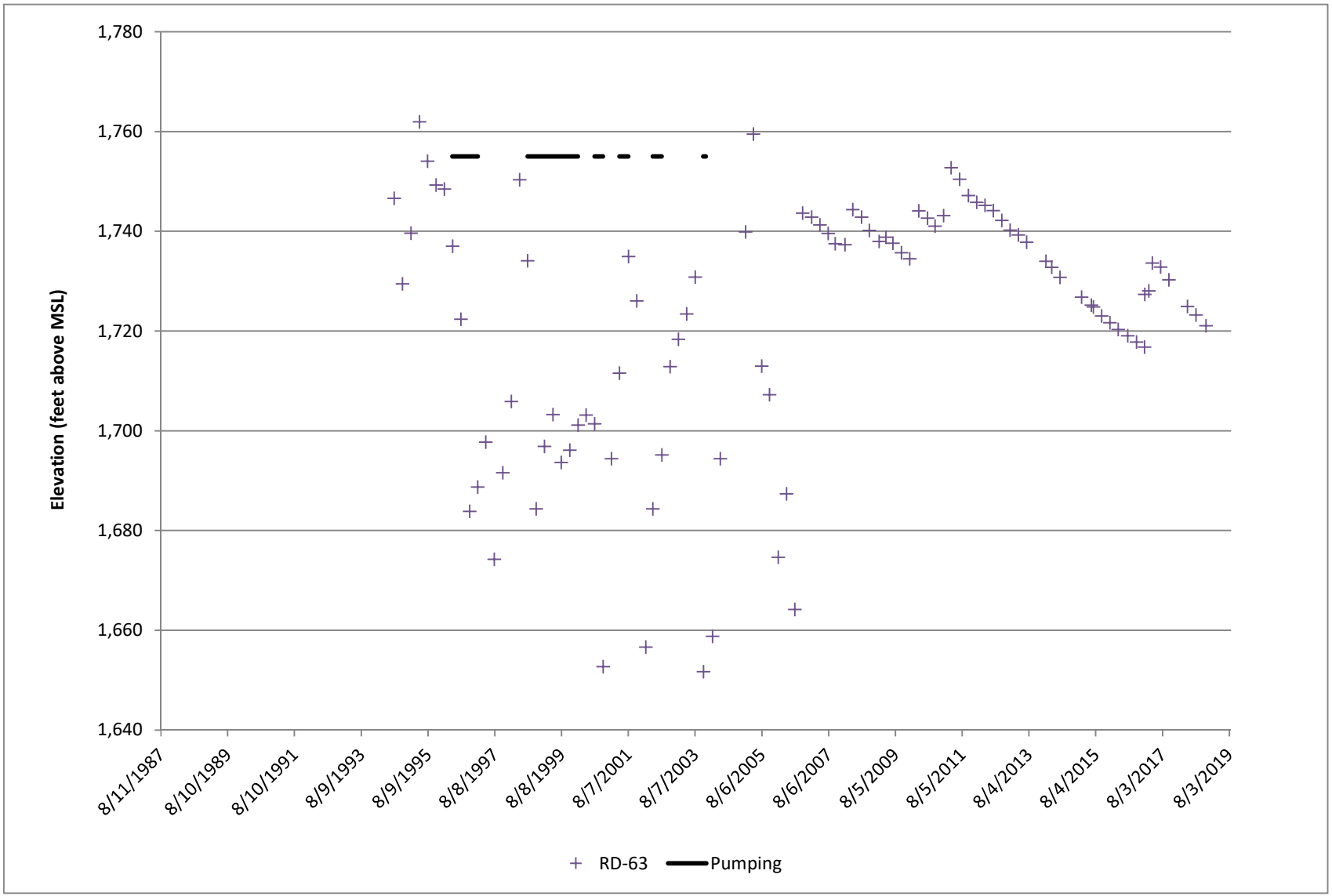
RD-95, Tritium Plume
Hydrograph



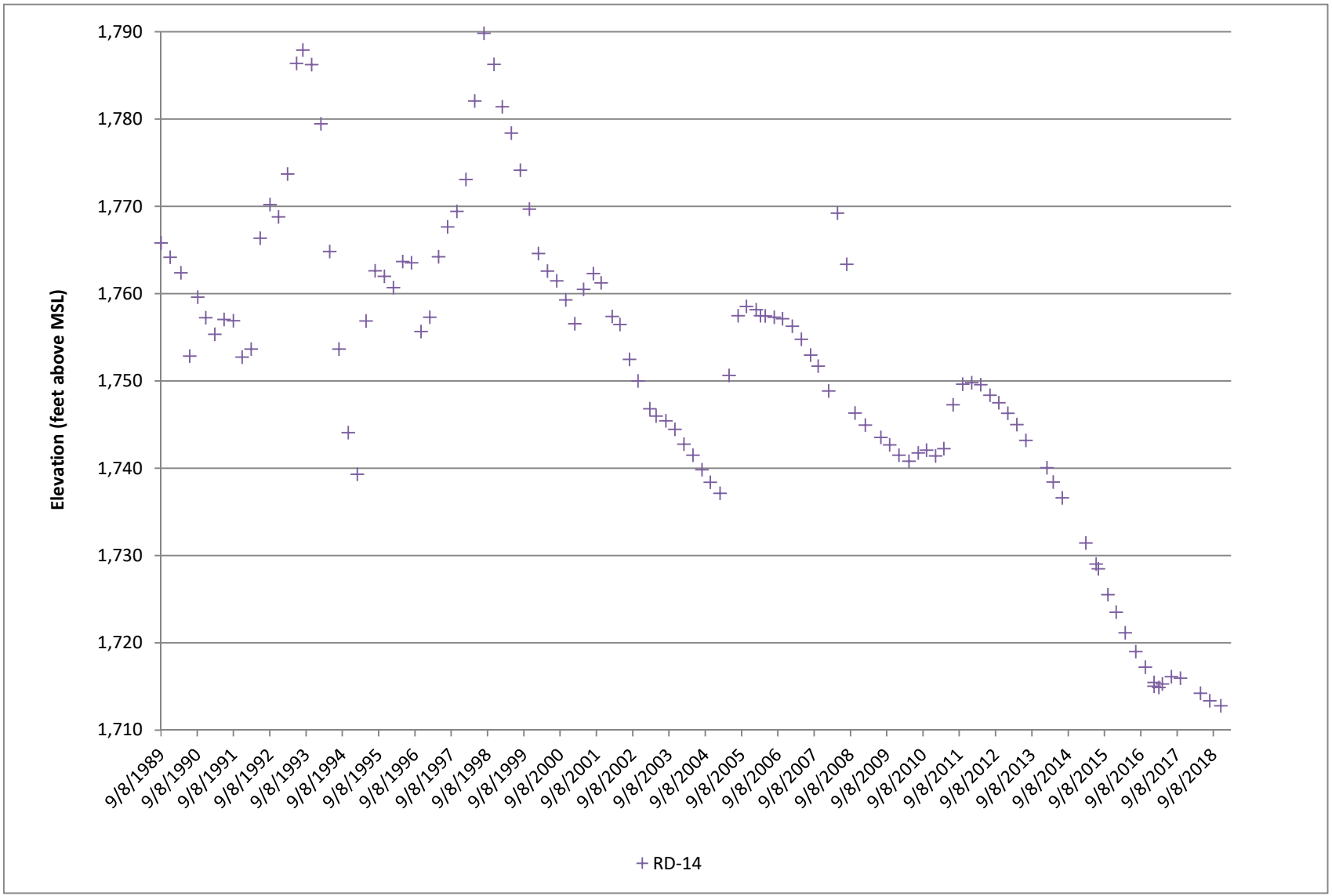
RD-30, RMHF
Hydrograph



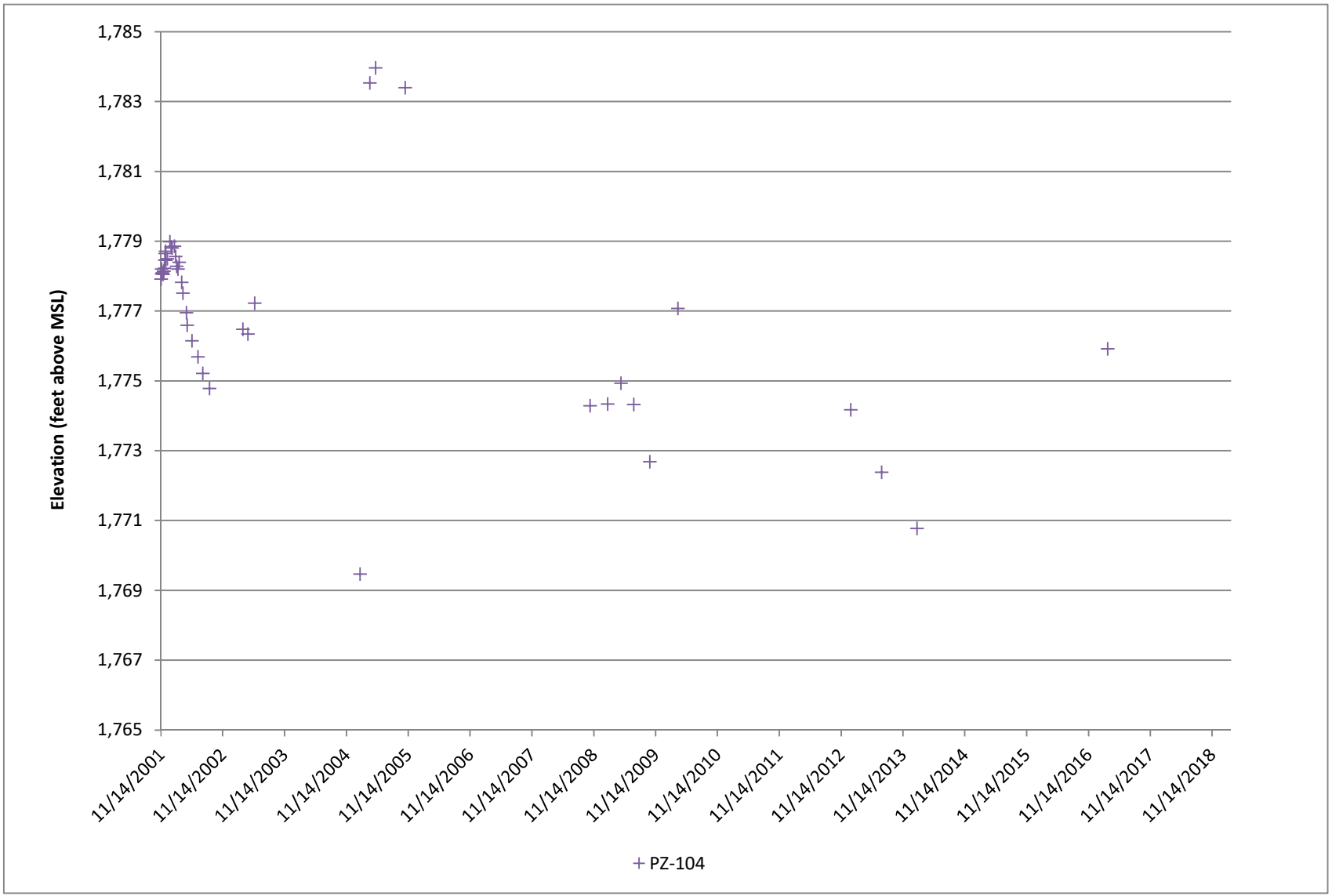
RD-63, RMHF
Hydrograph



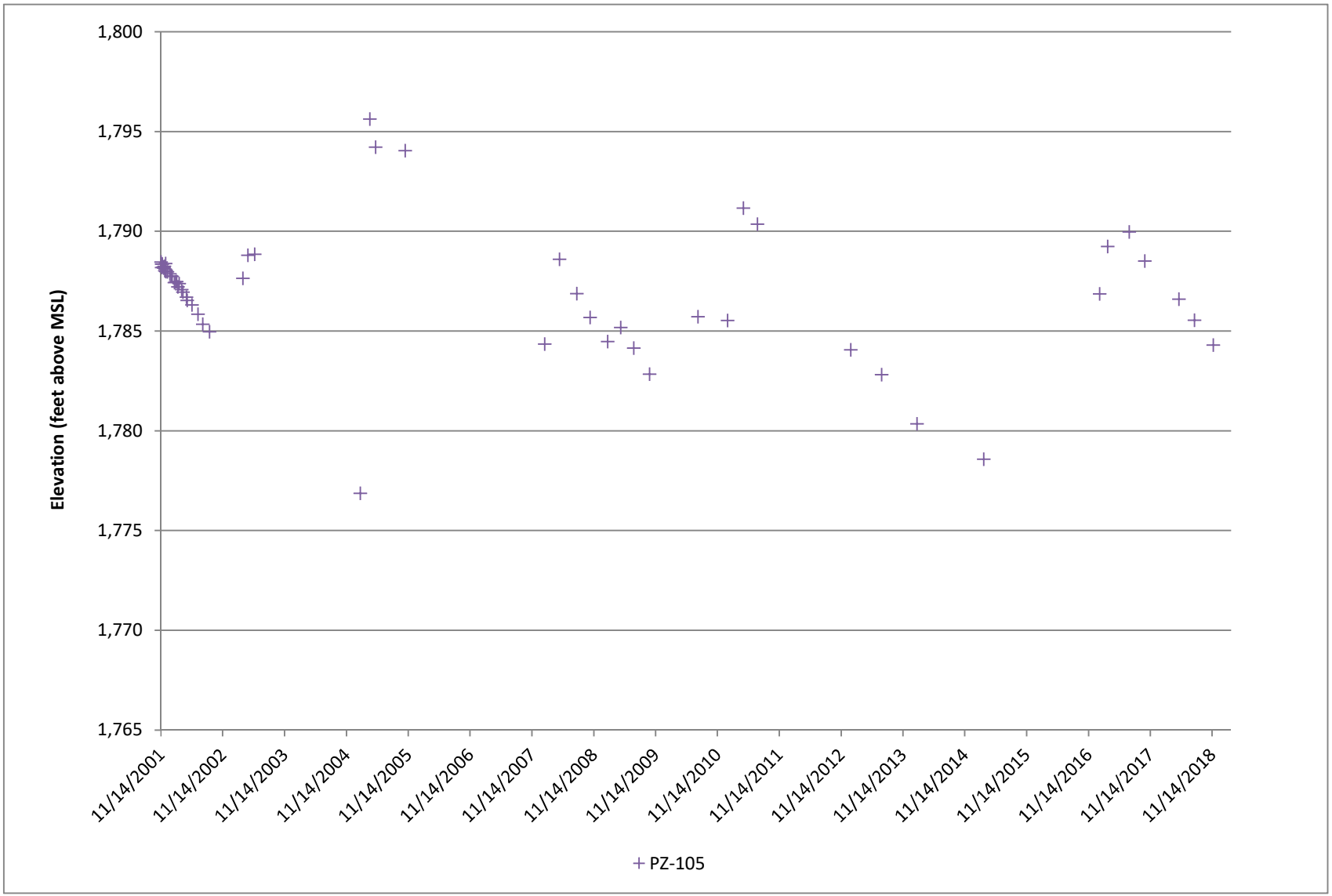
RD-14, OCY
Hydrograph



PZ-104, Bldg 65 Metals Clarifier / DOE LF3
Hydrograph



PZ-105, Bldg 65 Metals Clarifier / DOE LF3
Hydrograph



APPENDIX D
Time Series Plots of Analytical Data

Time series plots for trichloroethene (TCE), perchlorate, and tritium are presented in this appendix. Only primary sample results for the following wells are presented in the plots.

TCE

FSDF/ESADA	Bldg 56 Landfill	B4057/59/626
RD-21	RD-07	PZ-109
RD-33A		
RD-54A		
RD-54B		
RD-54C		
RD-64		
RD-65		
RS-18		
RS-54		

RMHF	HMSA/PDU	OCY
RD-30	PZ-108	RD-14
RD-34A	PZ-120	
RD-34B		
RD-63		
RD-98		
RS-28		

Bldg 65 Metals Clarifier

PZ-005

PZ-104

PZ-105

Southeast Drum Storage

PZ-051

PZ-052

Pond Dredge Area

RD-13

Bldg 4100/4009

RD-91

Perchlorate

FSDF/ESADA

RD-21

RD-54A

RS-18

RS-54

Tritium Plume

RD-34A

RD-88

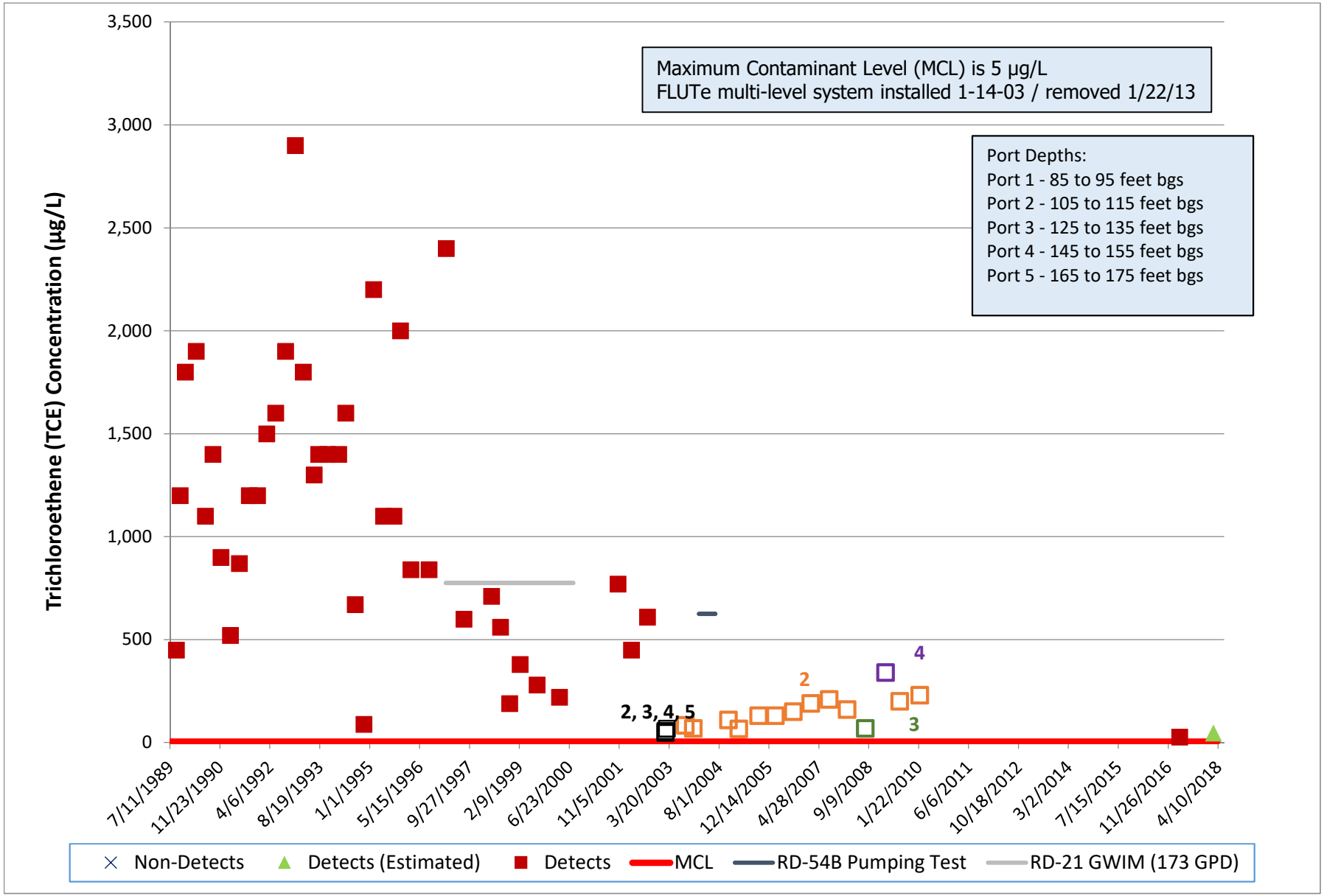
RD-90

RD-93

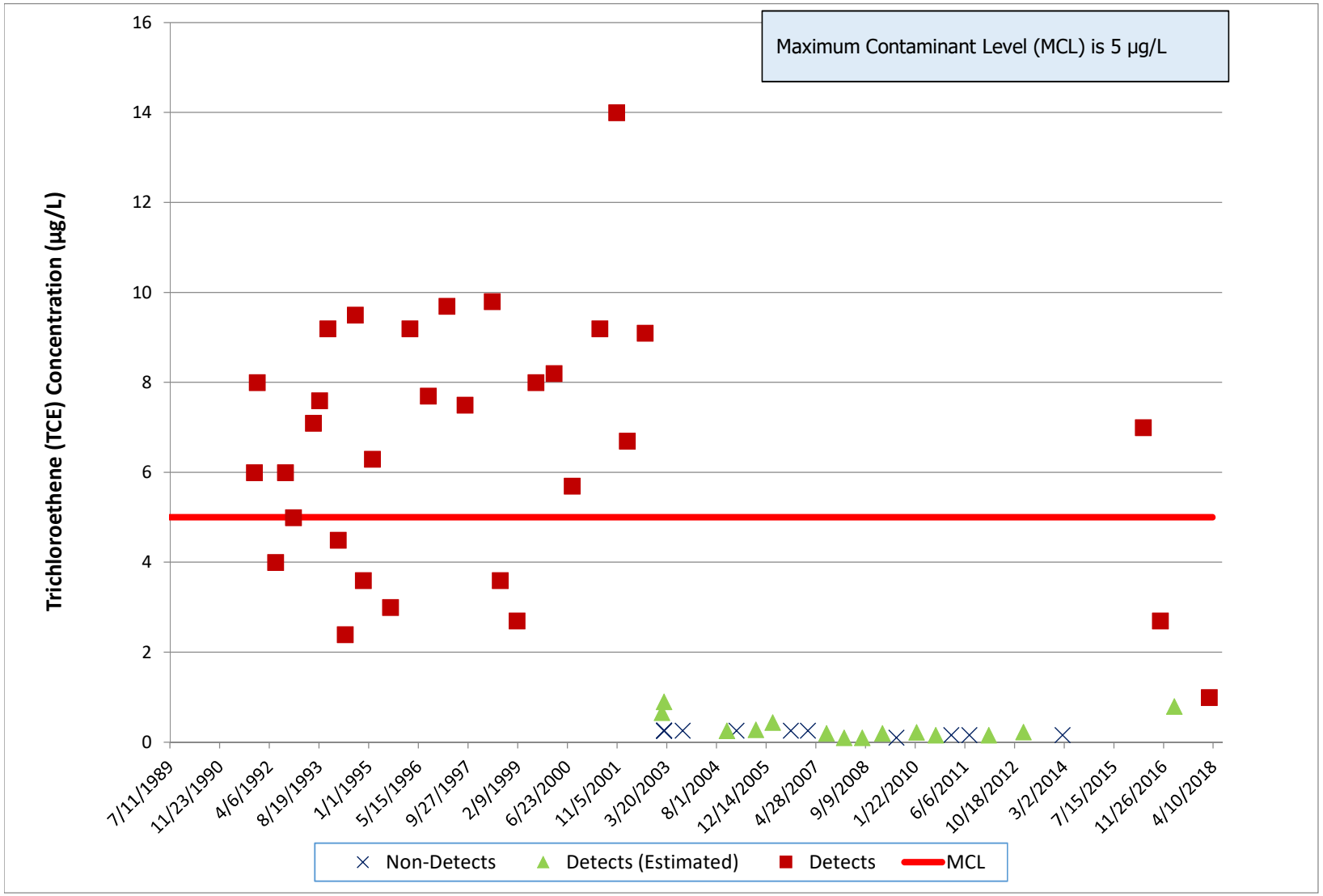
RD-94

RD-95

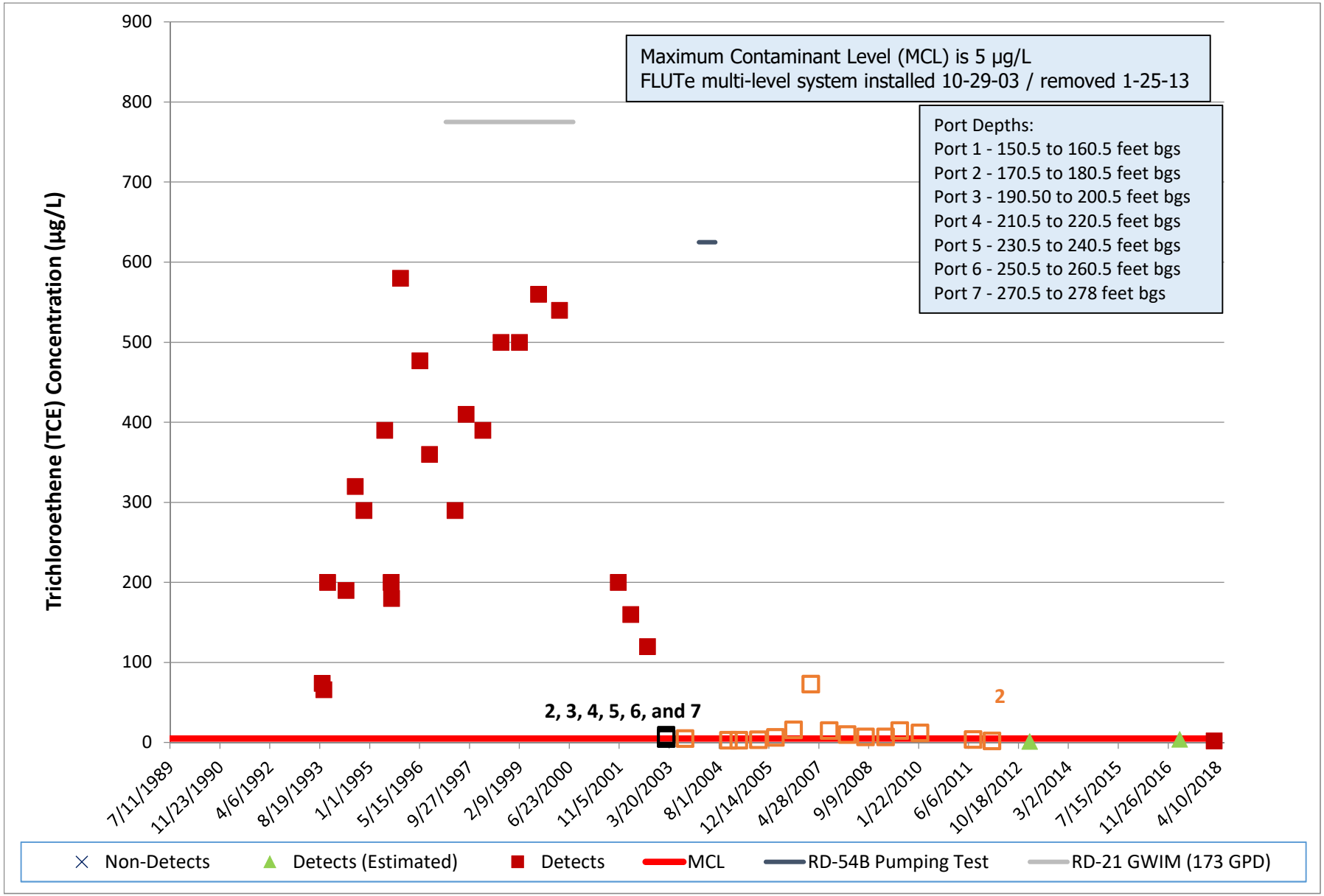
RD-21, FSDF/ESADA
Trichloroethene



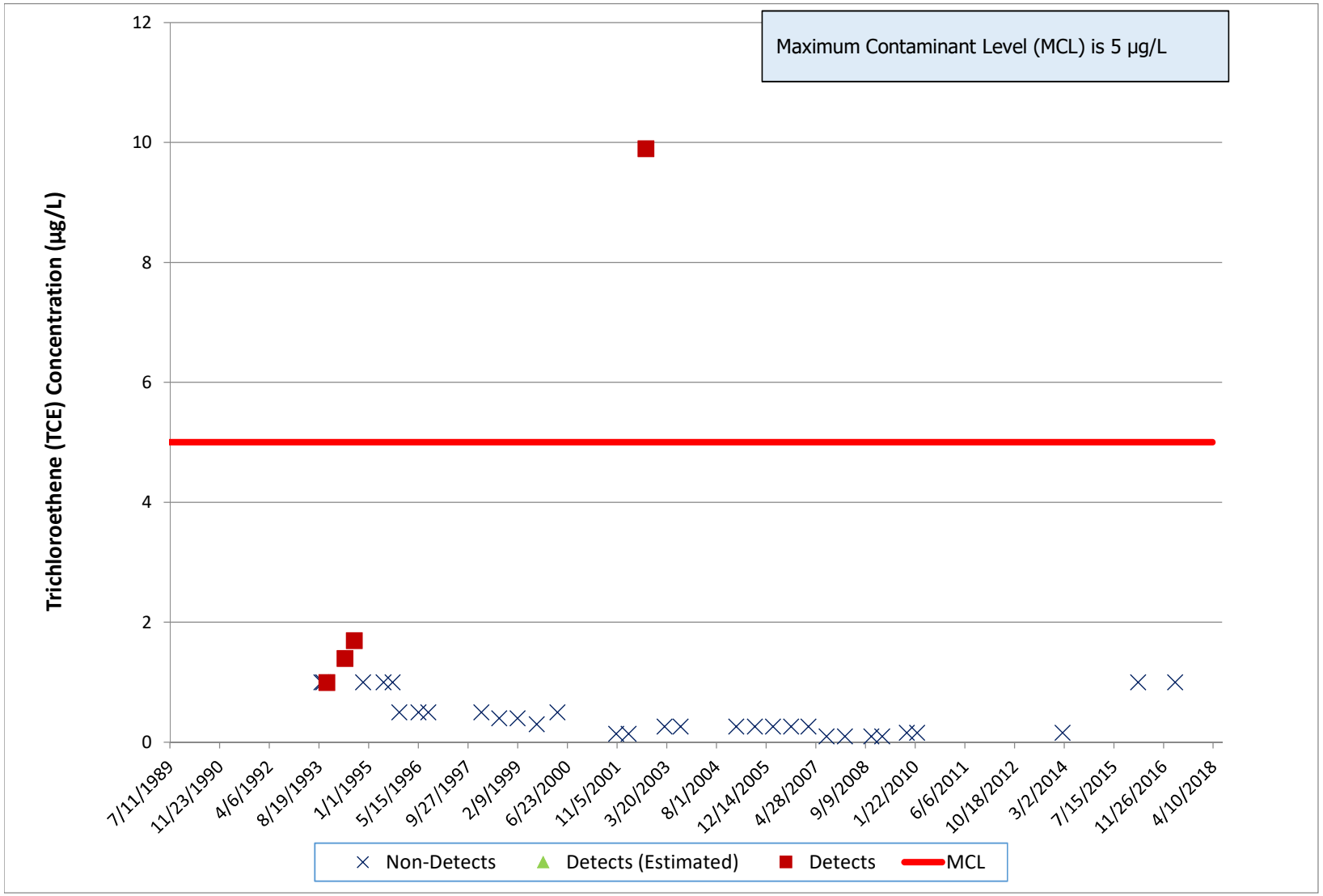
RD-33A,FSDF/ESADA
Trichloroethene



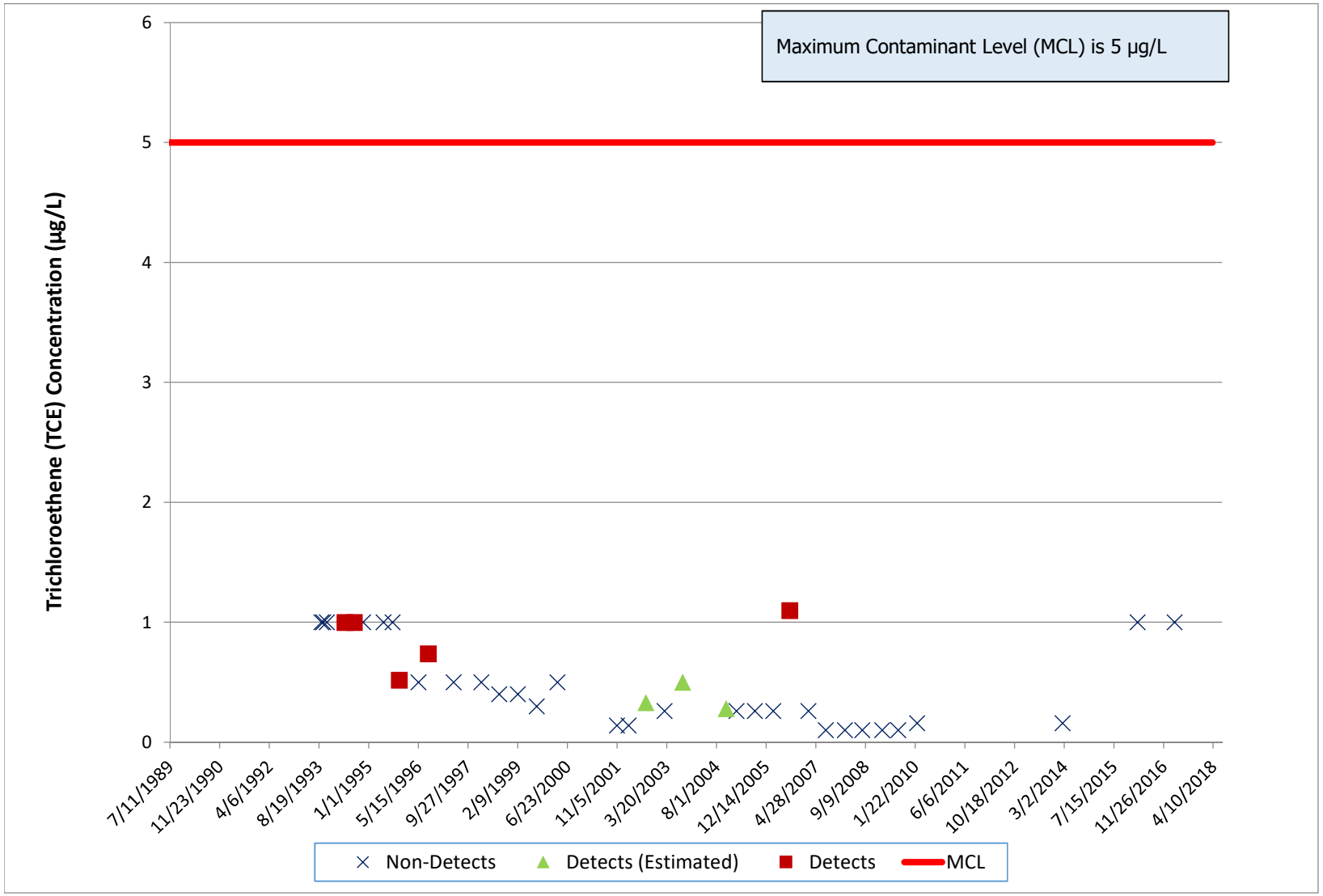
RD-54A FSDF/ESADA
Trichloroethene



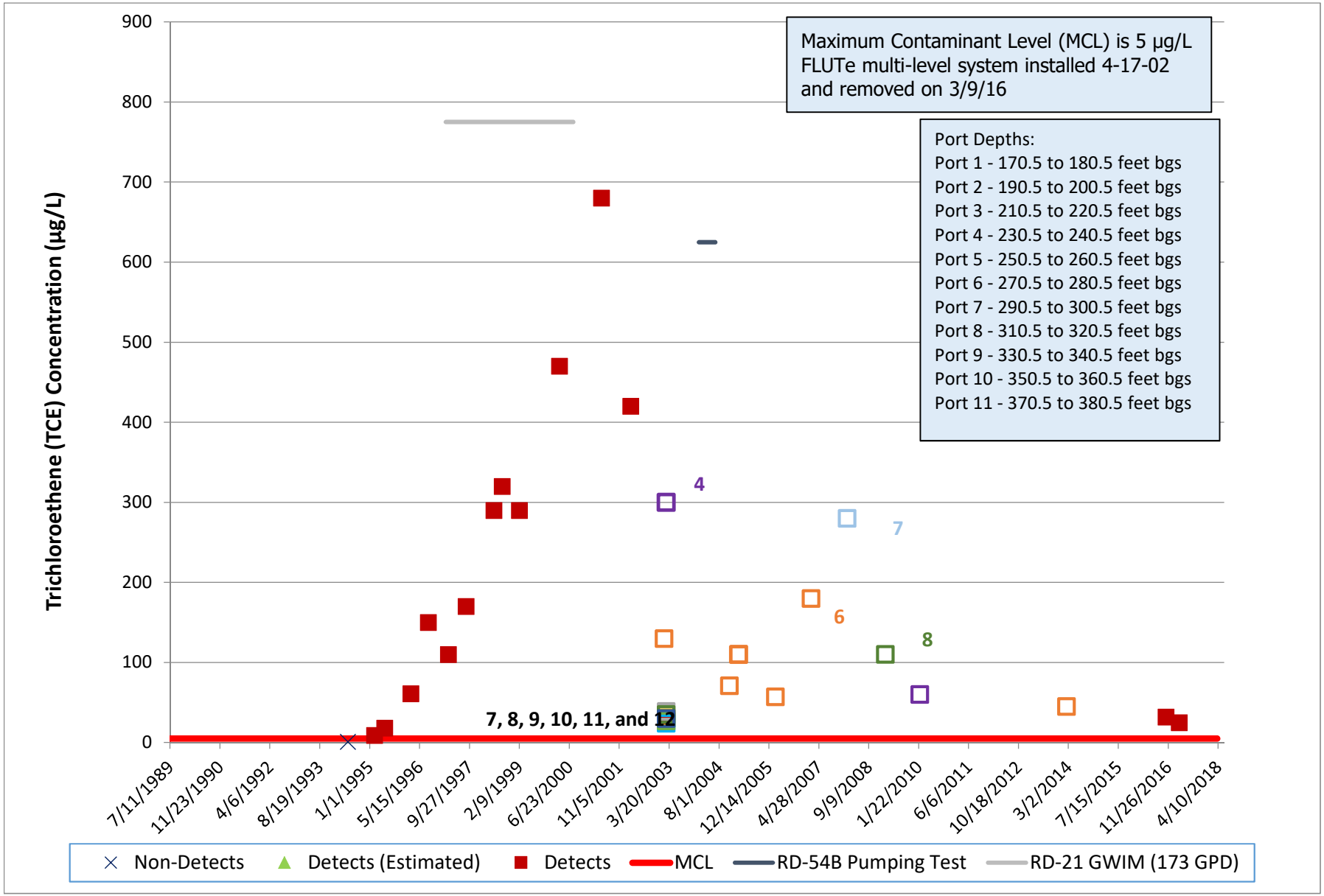
RD-54B, FSDF/ESADA
Trichloroethene



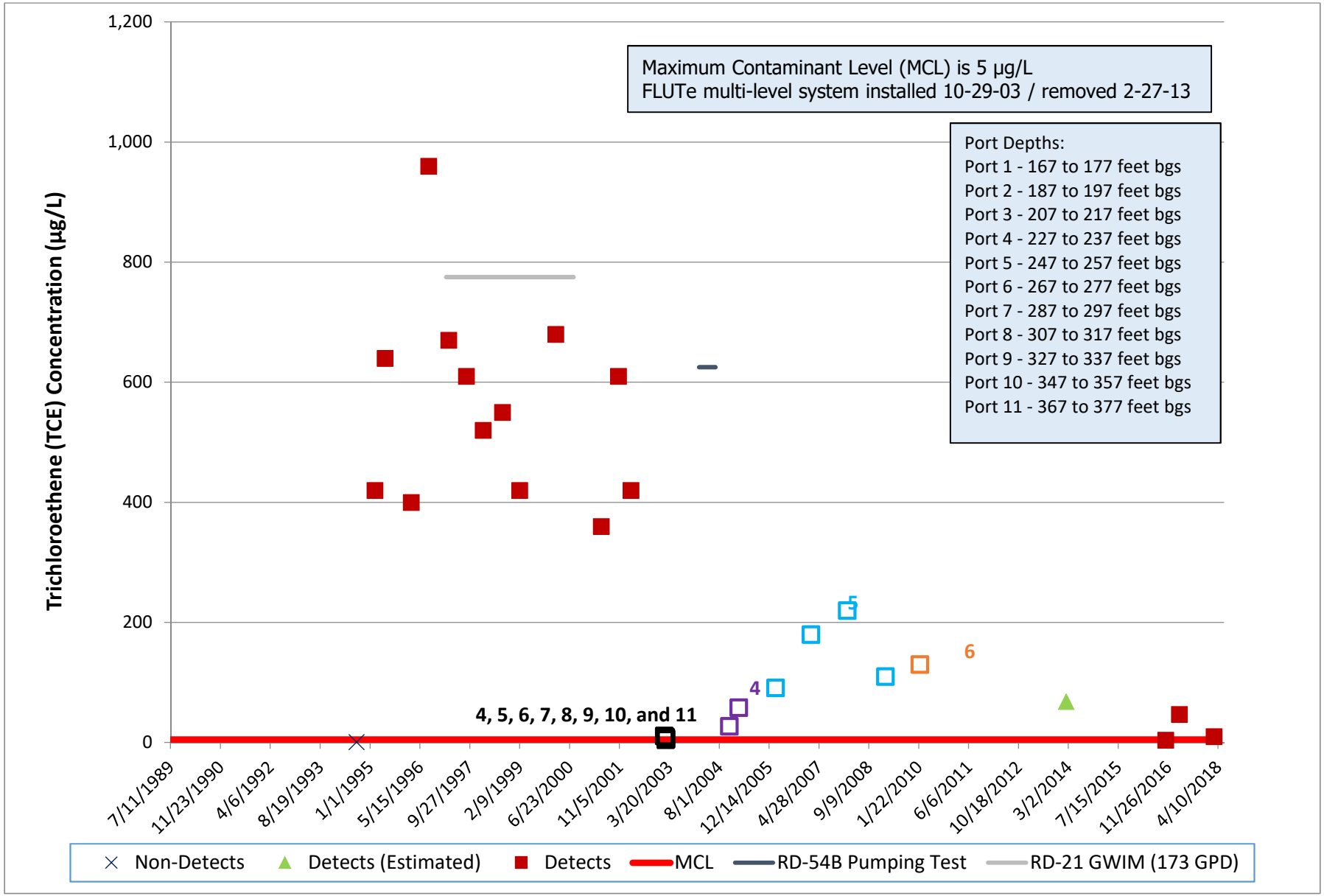
RD-54C, FSDF/ESADA
Trichloroethene



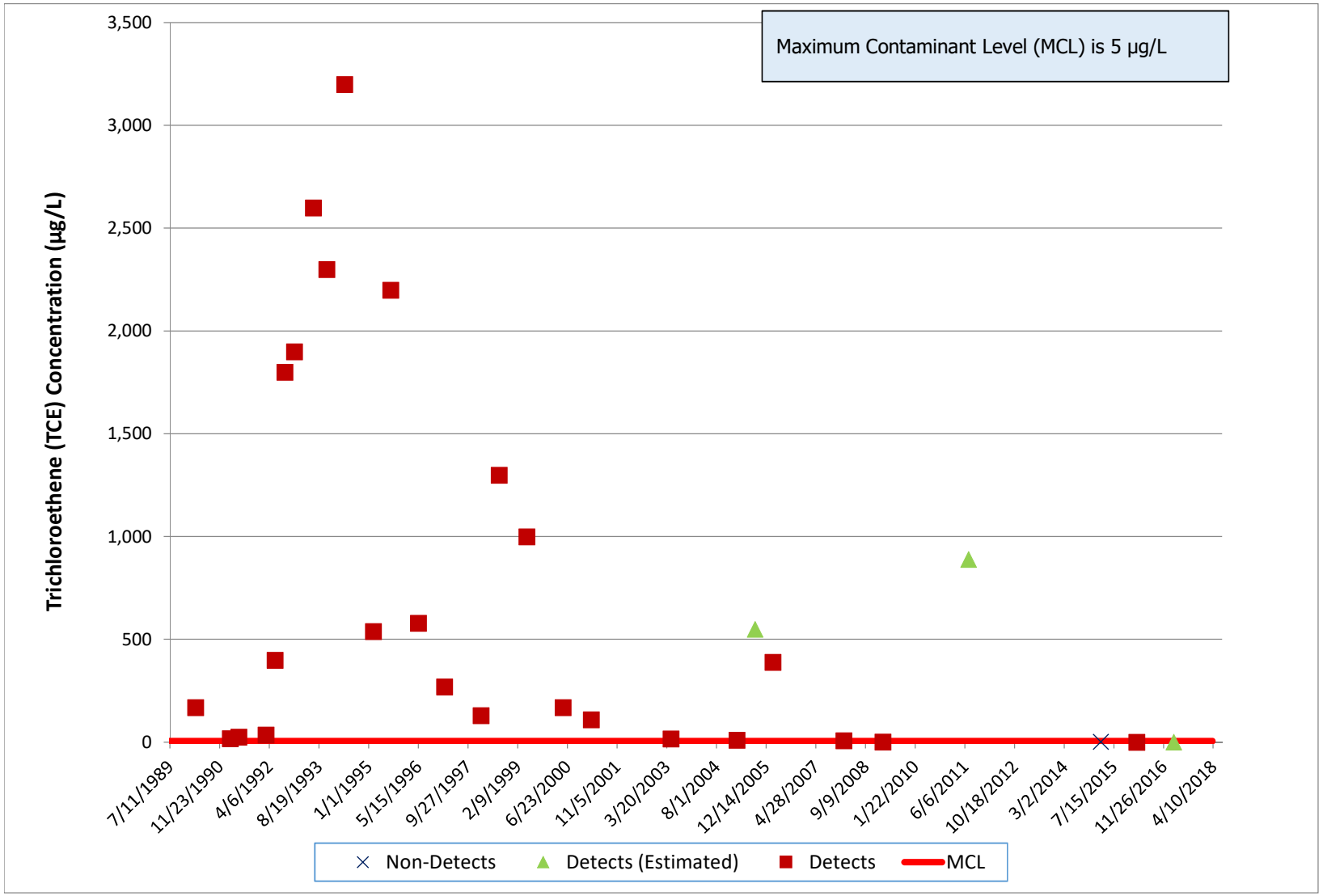
RD-64, FSDF/ESADA
Trichloroethene



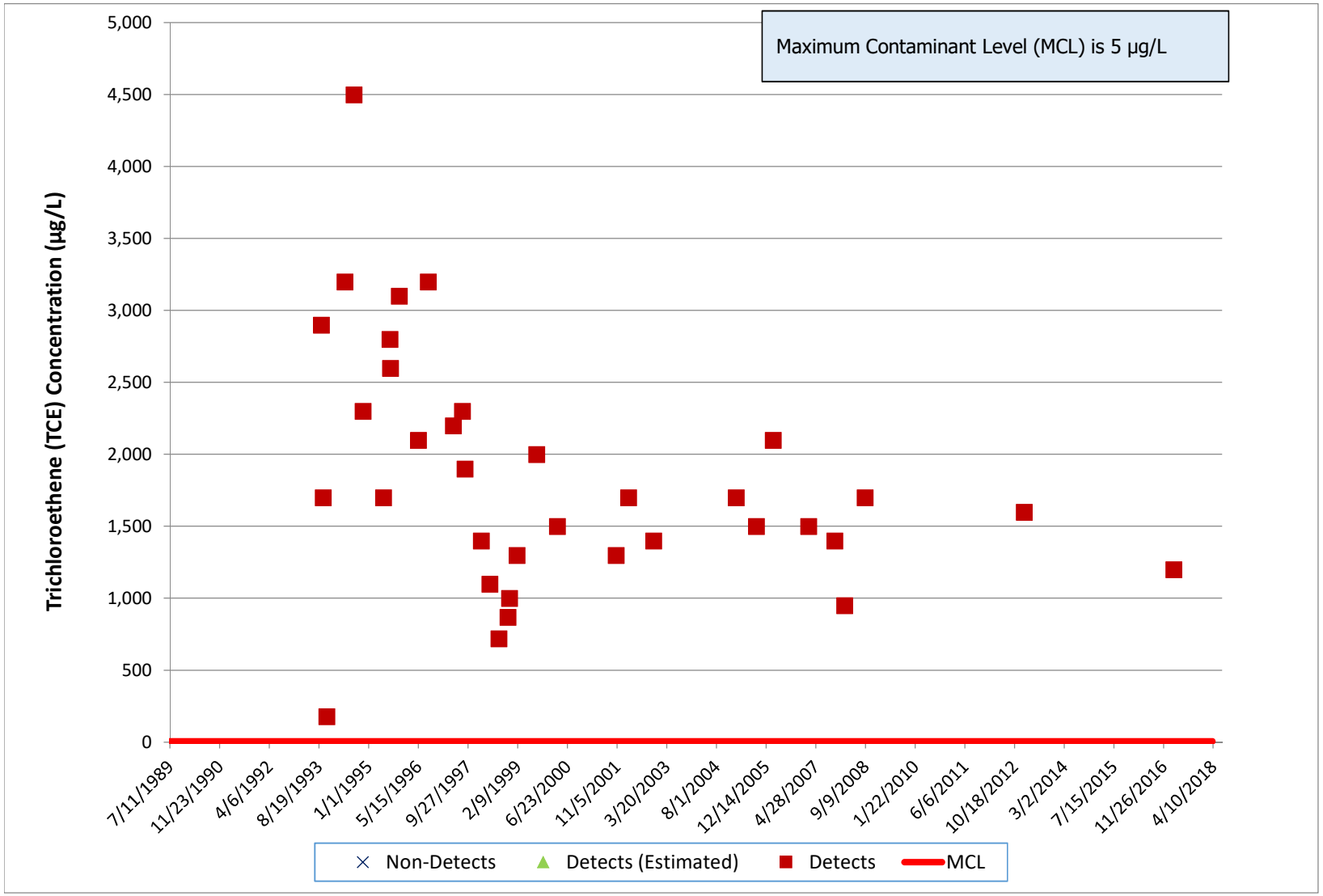
RD-65, FSDF/ESADA
Trichloroethene



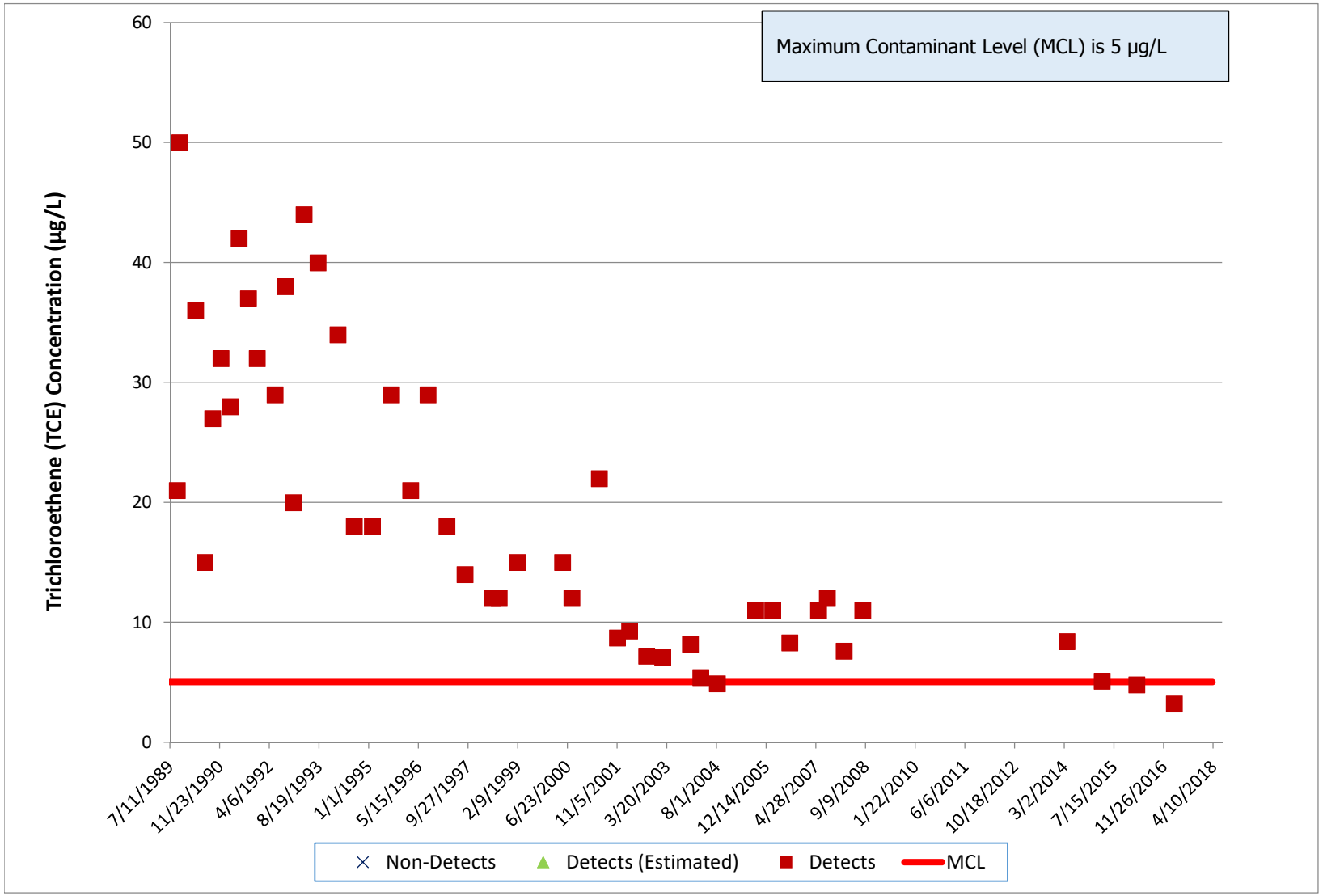
RS-18, FSDF/ESADA
Trichloroethene



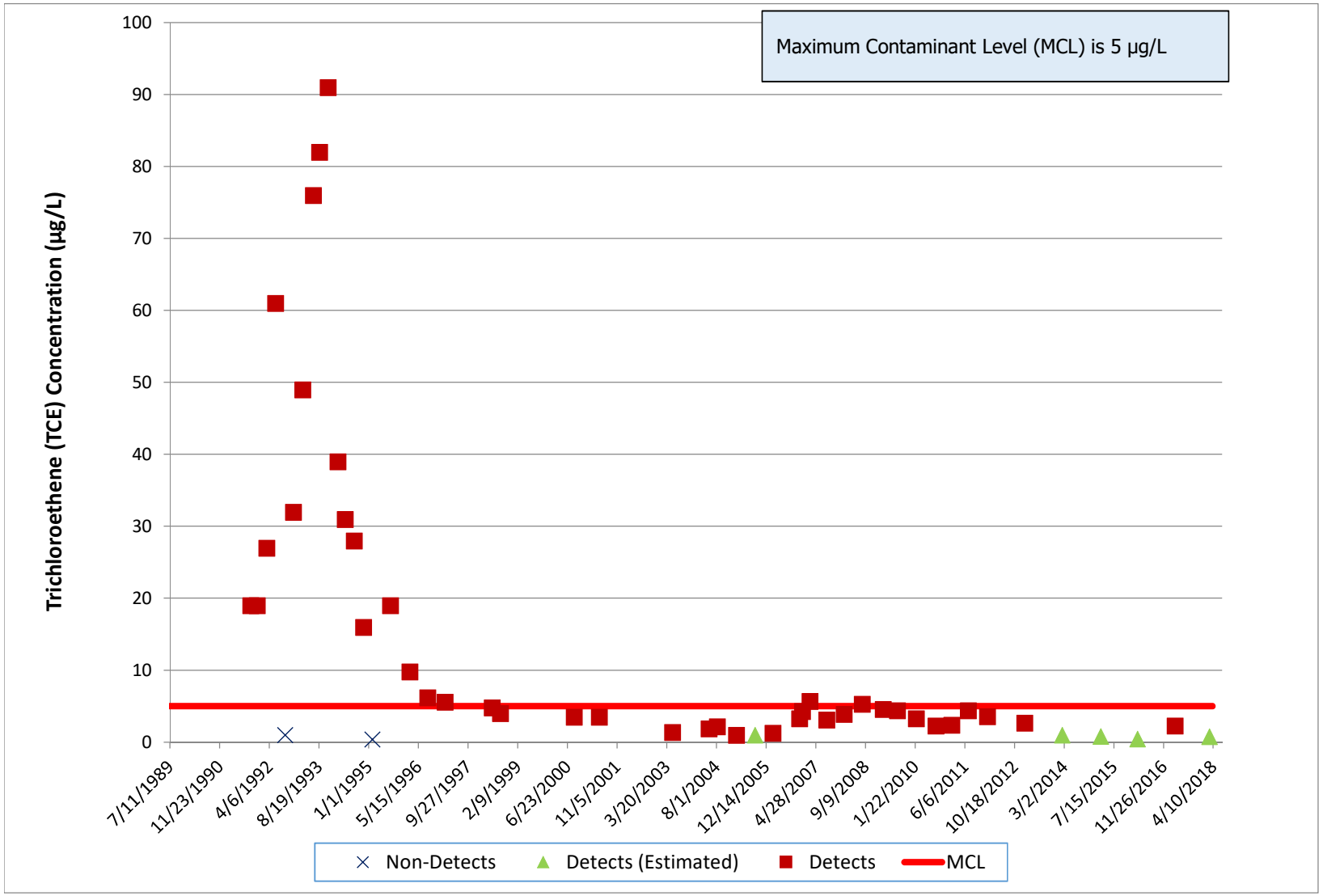
RS-54, FSDF/ESADA
Trichloroethene



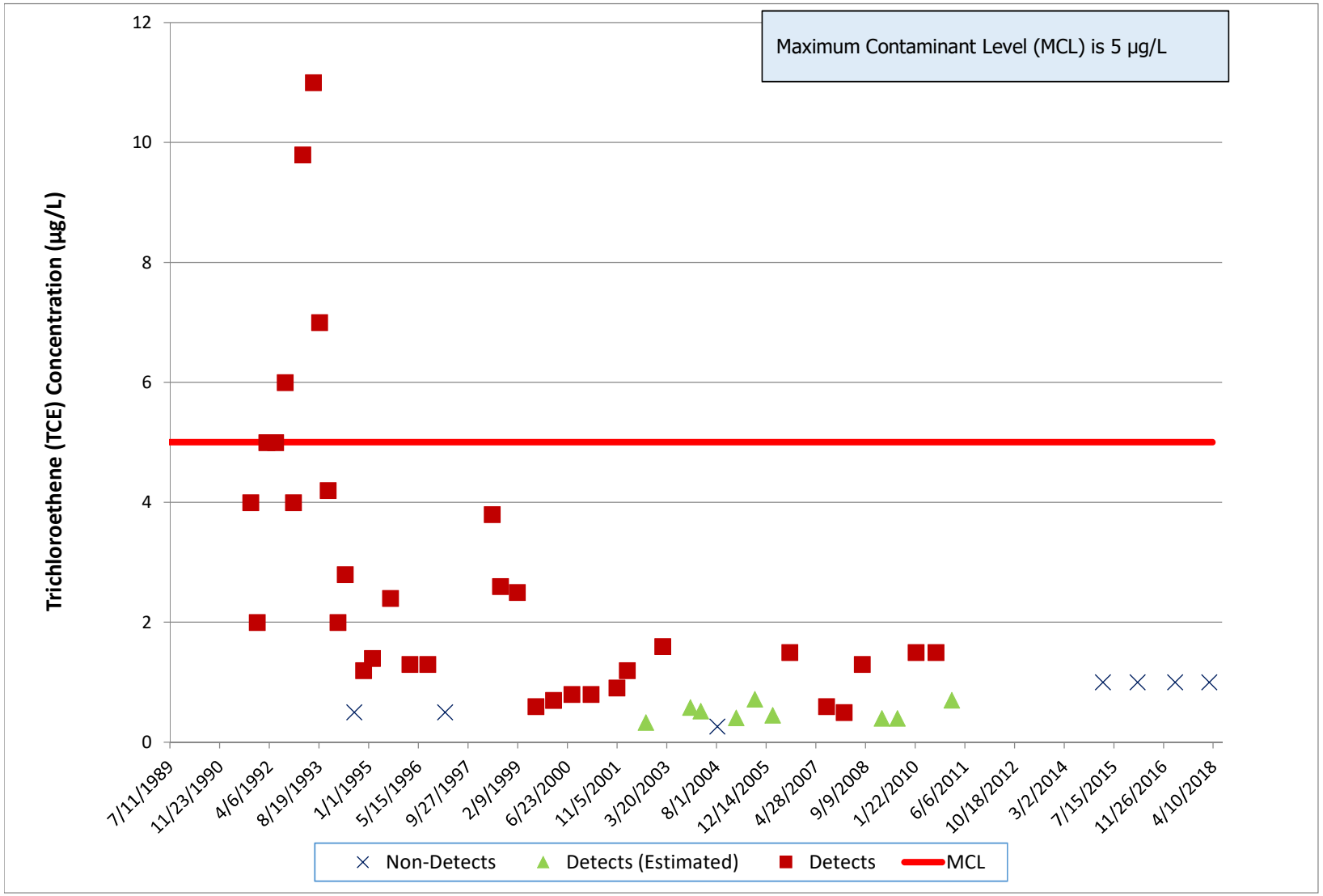
RD-30, RMHF
Trichloroethene



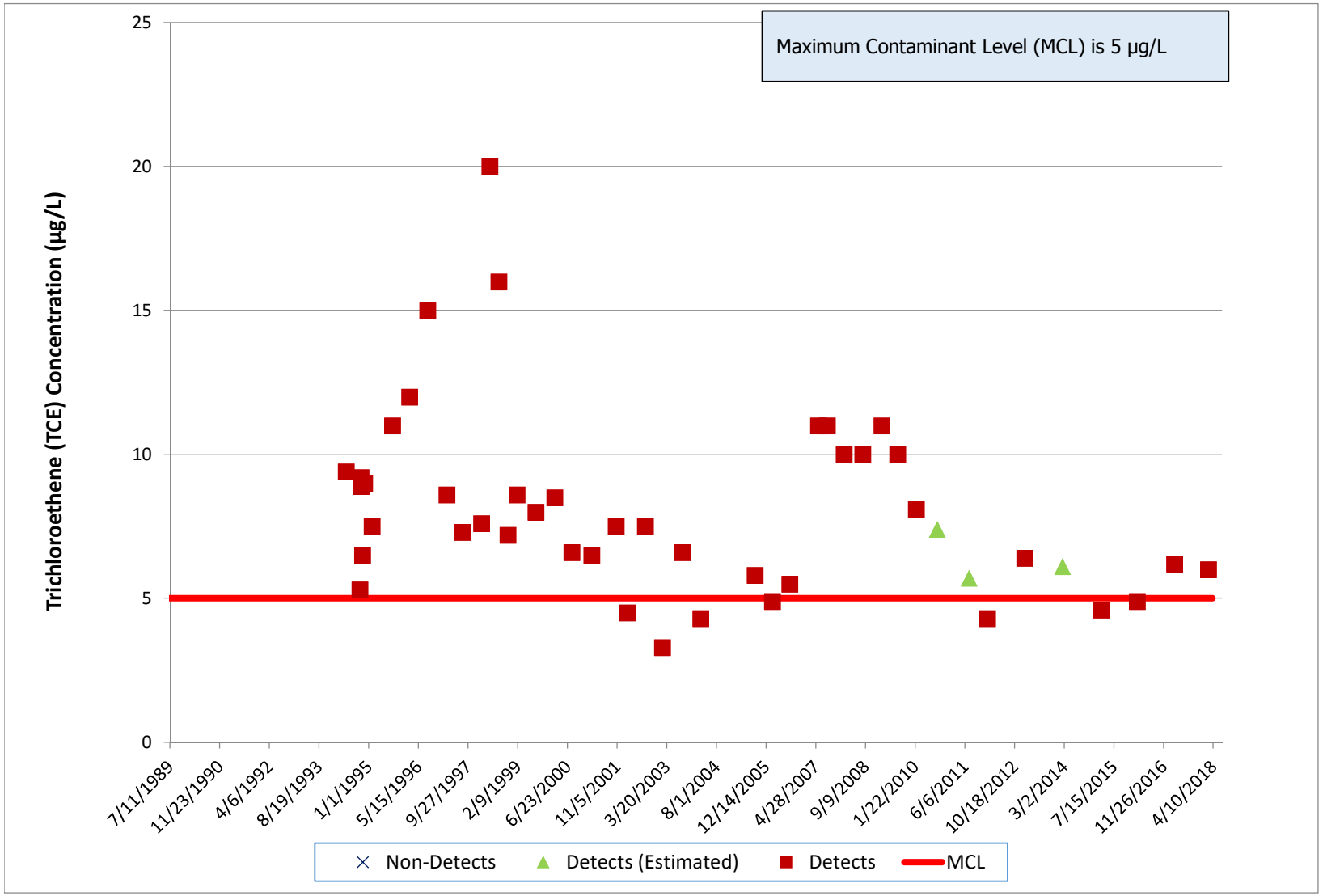
RD-34A, RMHF
Trichloroethene



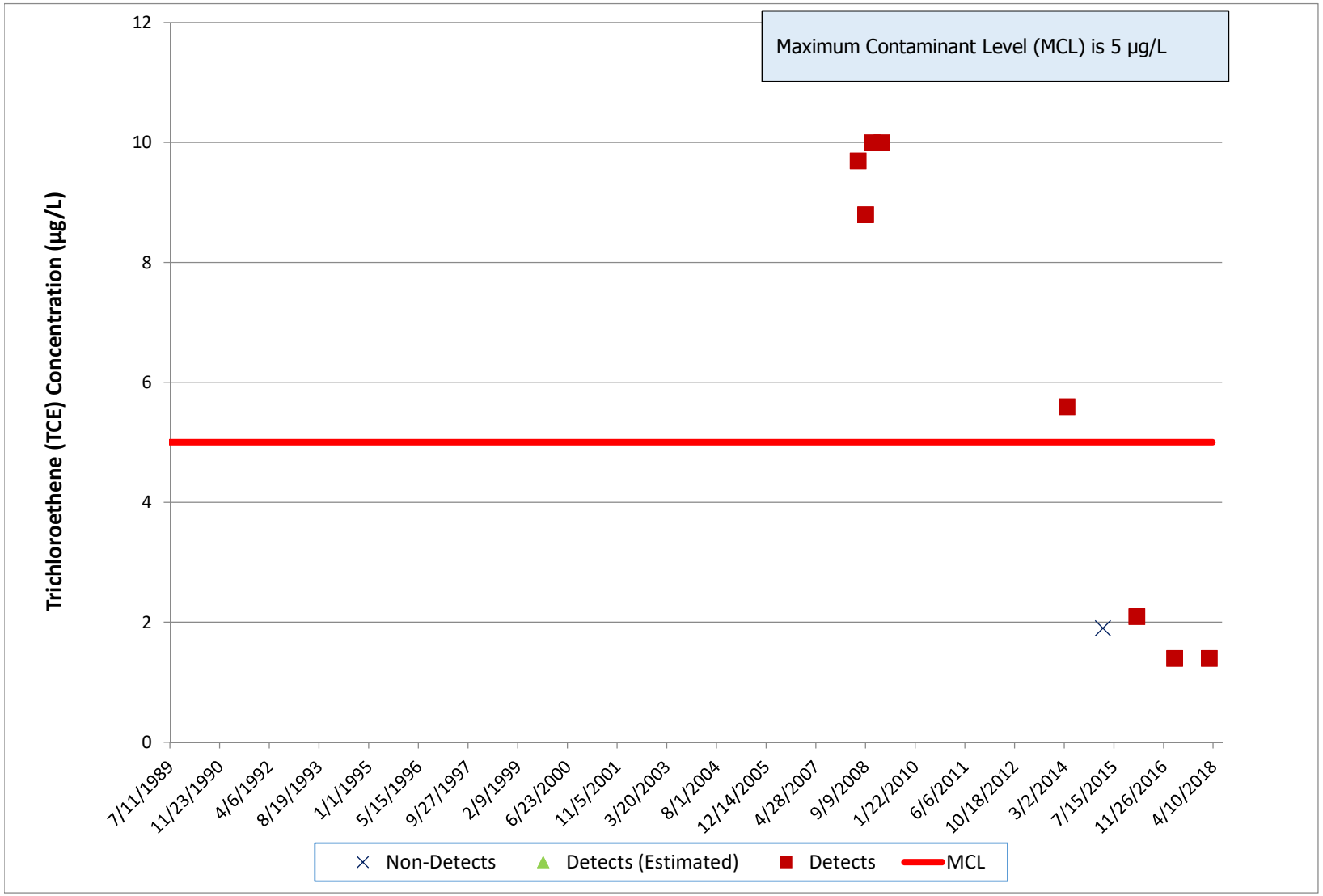
RD-34B, RMHF
Trichloroethene



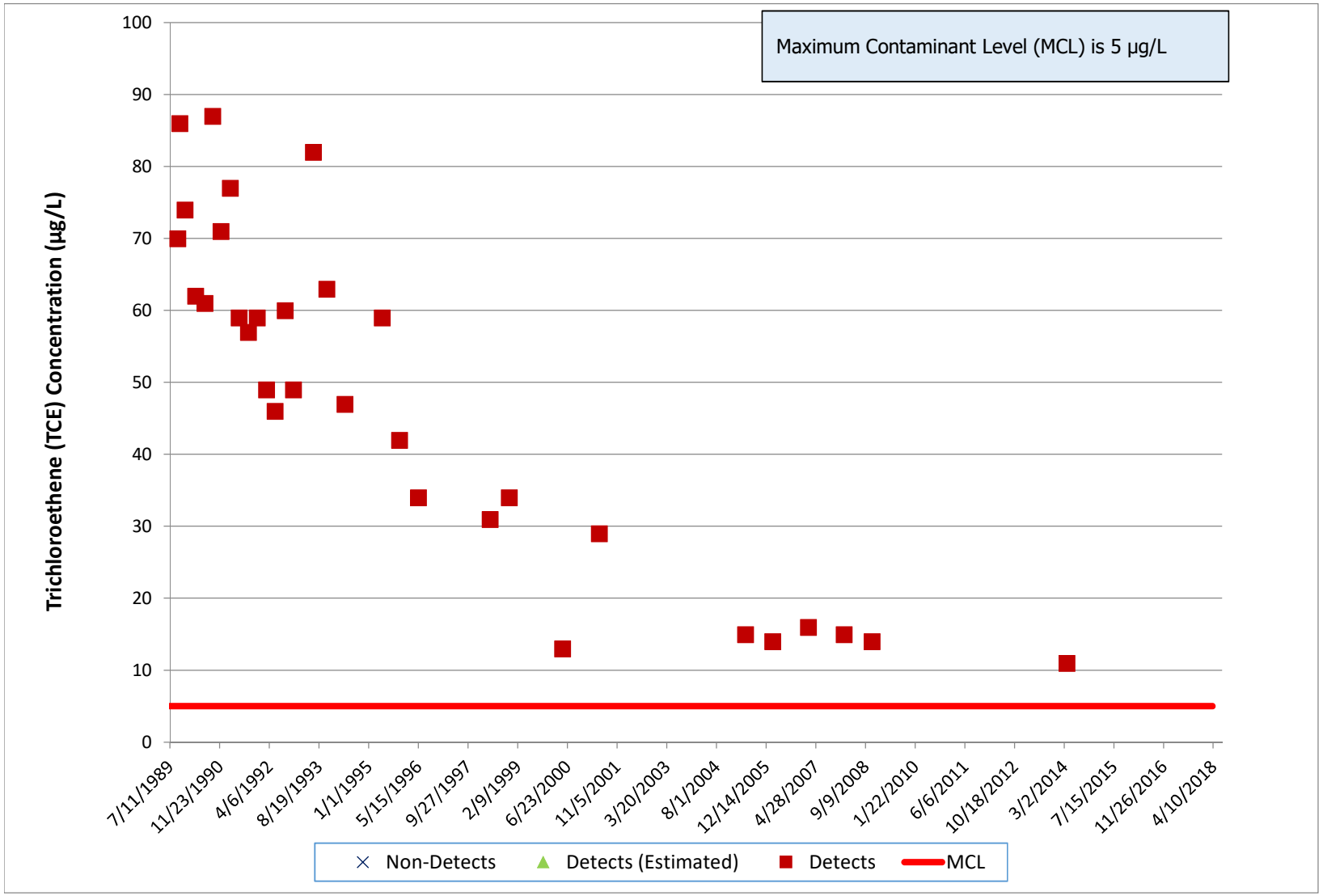
RD-63, RMHF
Trichloroethene



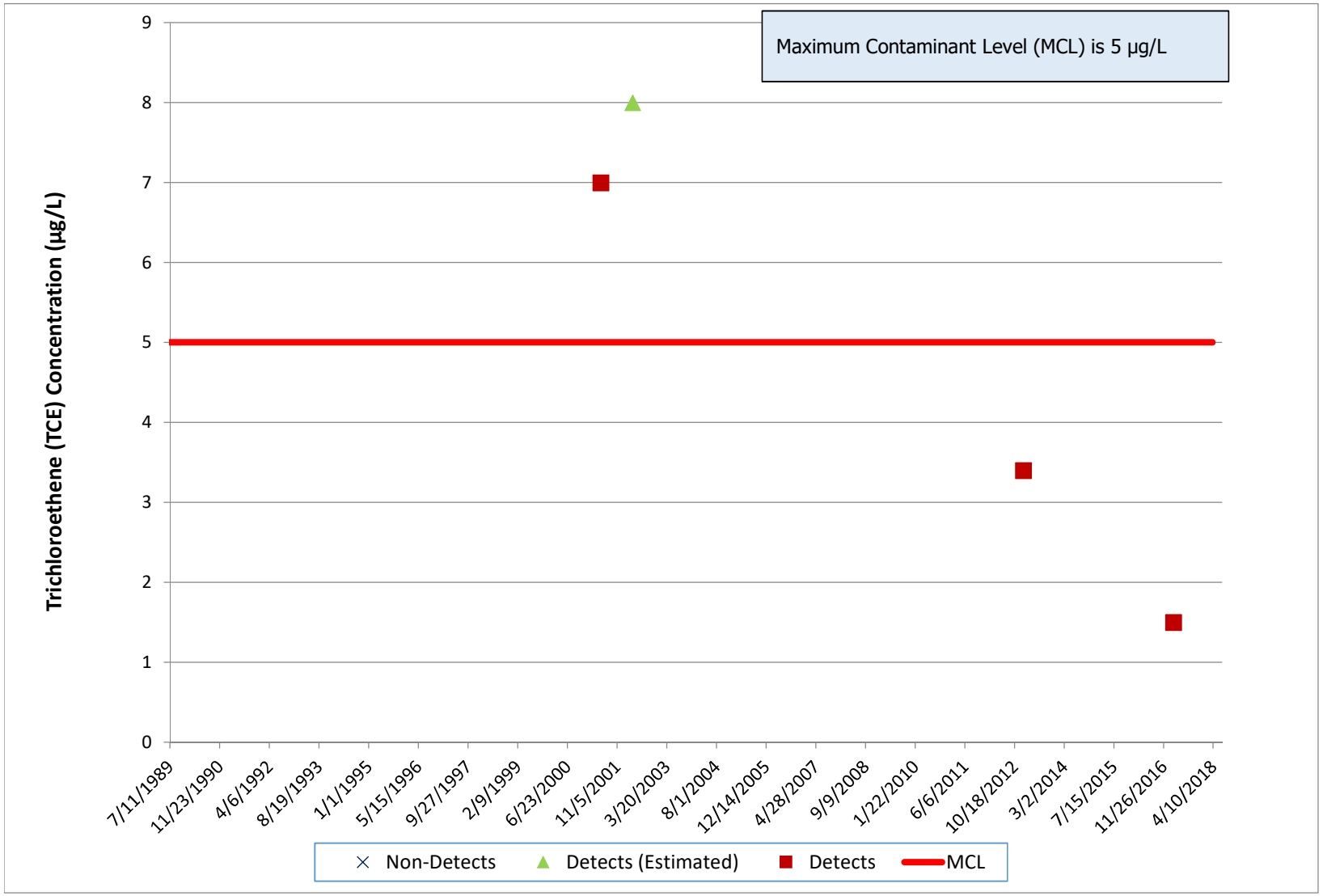
RD-98, RMHF
Trichloroethene



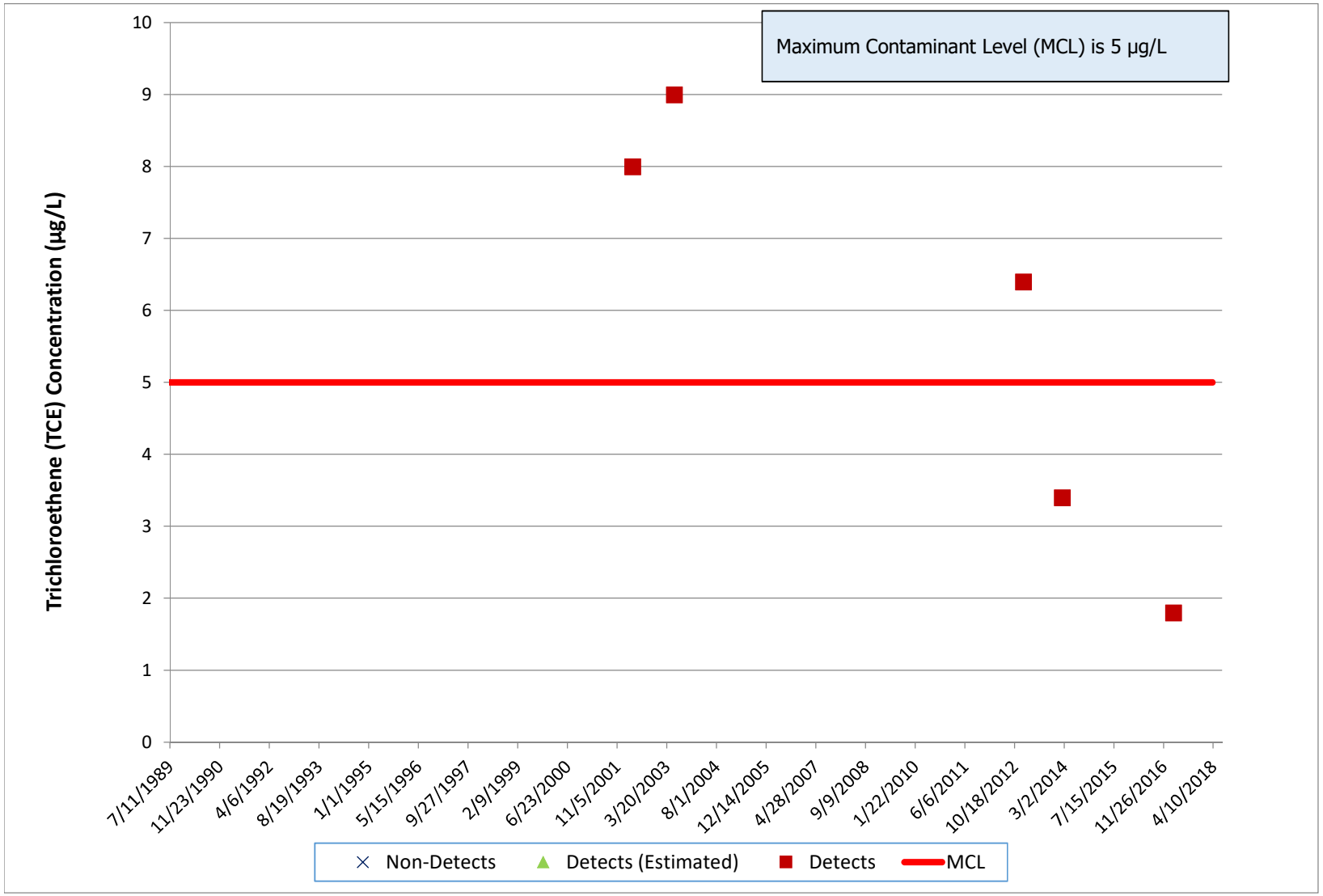
RS-28, RMHF
Trichloroethene



PZ-005, Bldg 65 Metals Clarifier
Trichloroethene



PZ-104, Bldg 65 Metals Clarifier
Trichloroethene



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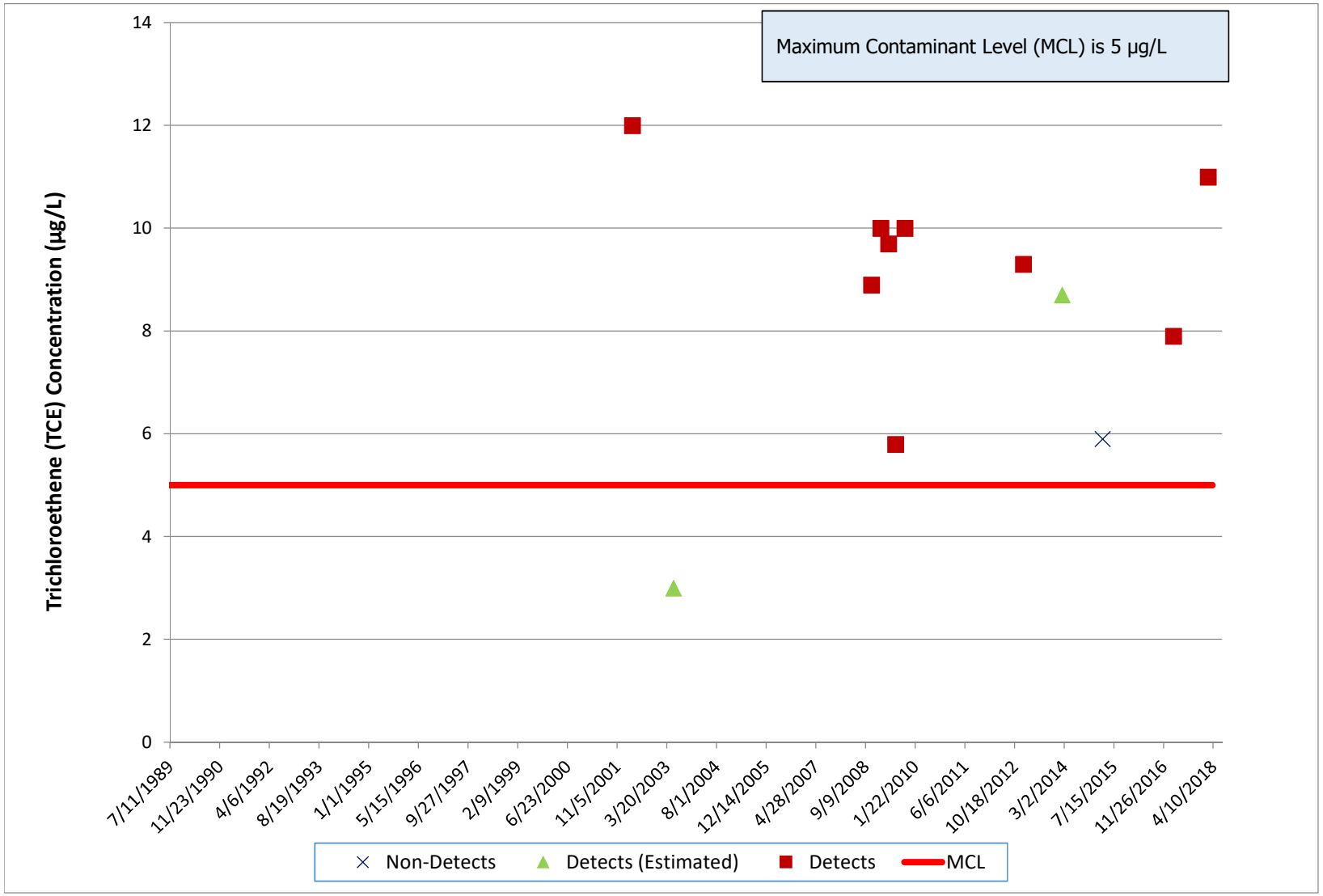
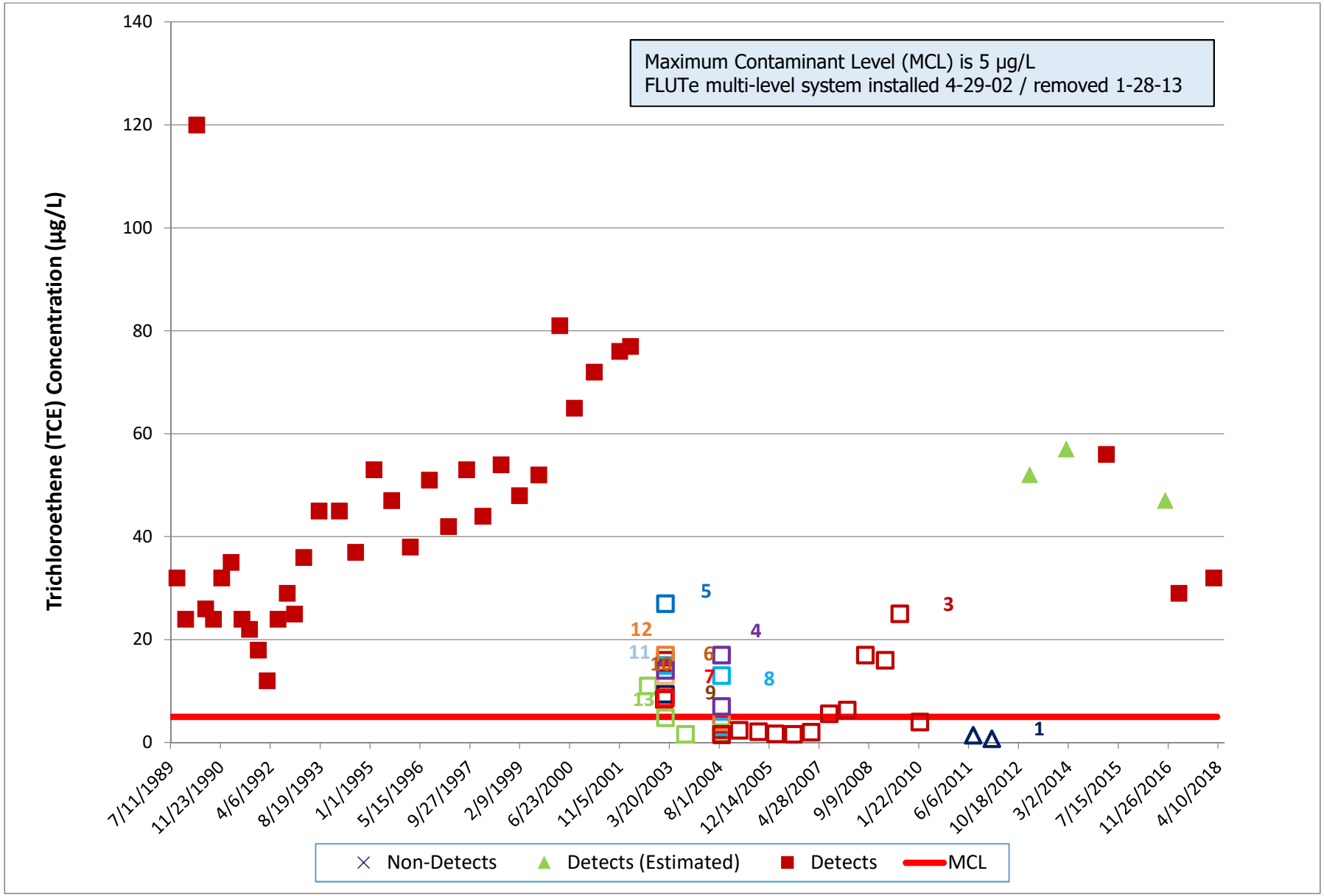
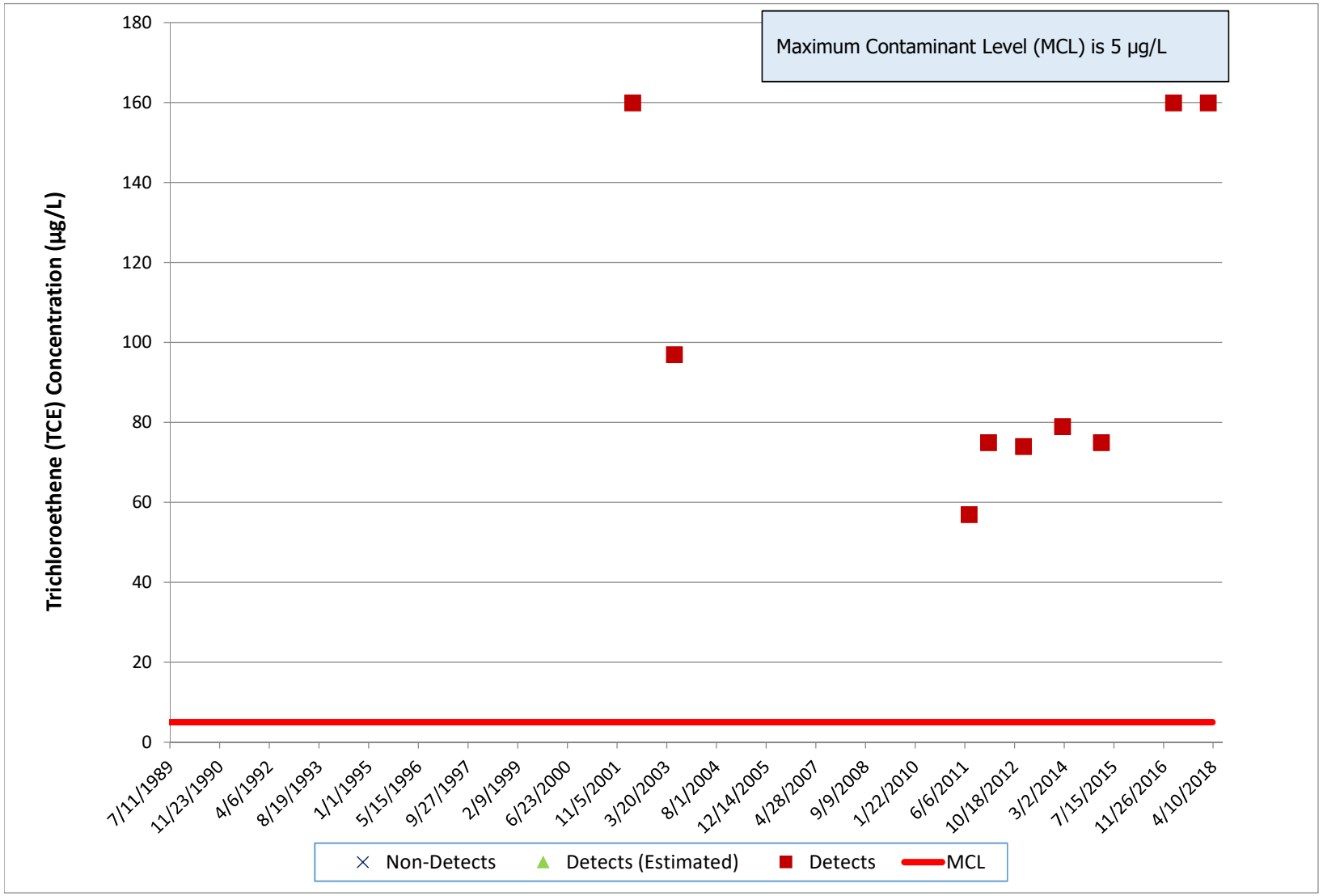
Trichloroethene



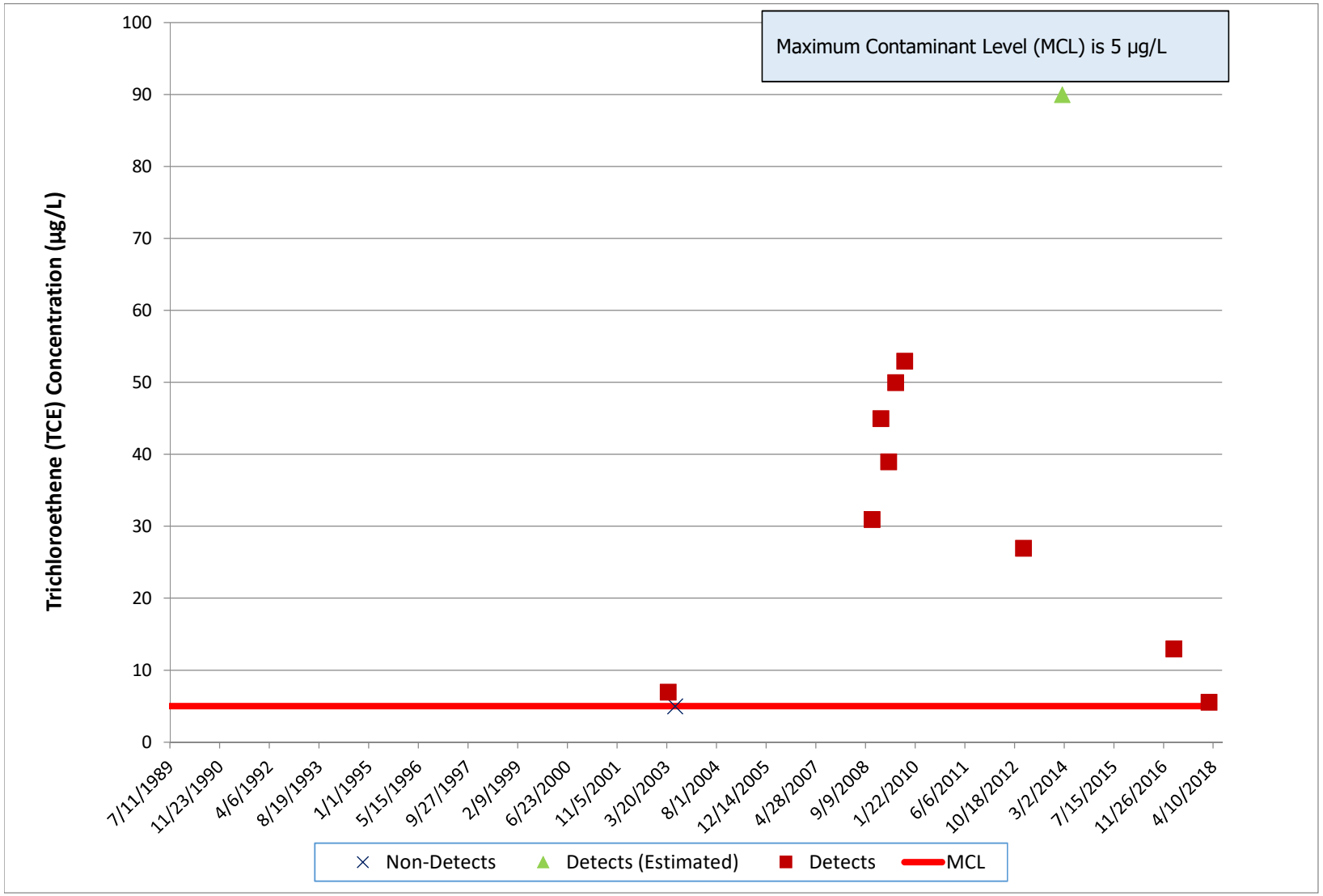
RD-07, Bldg 56 Landfill
Trichloroethene



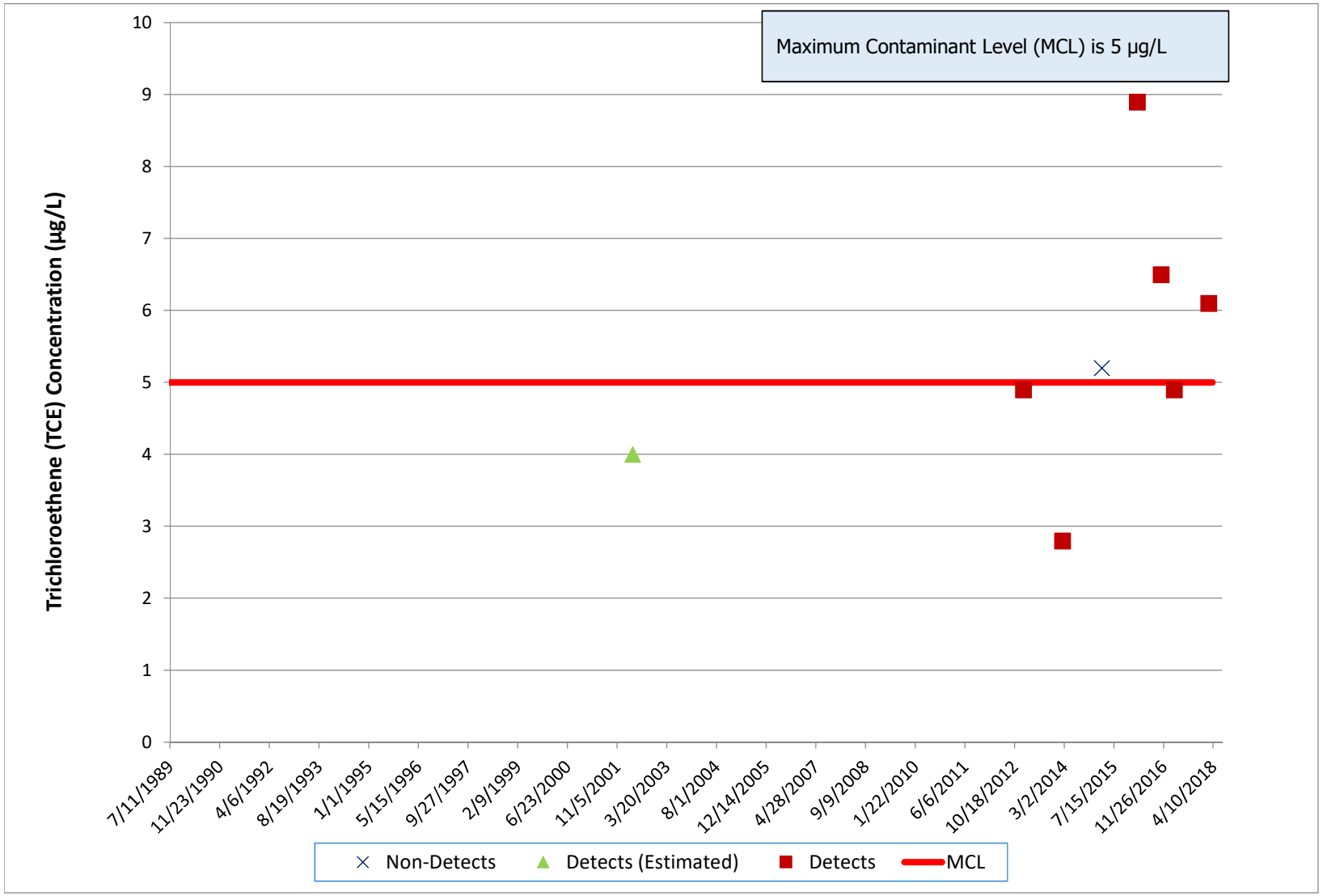
PZ-108, HMSA/PDU
Trichloroethene



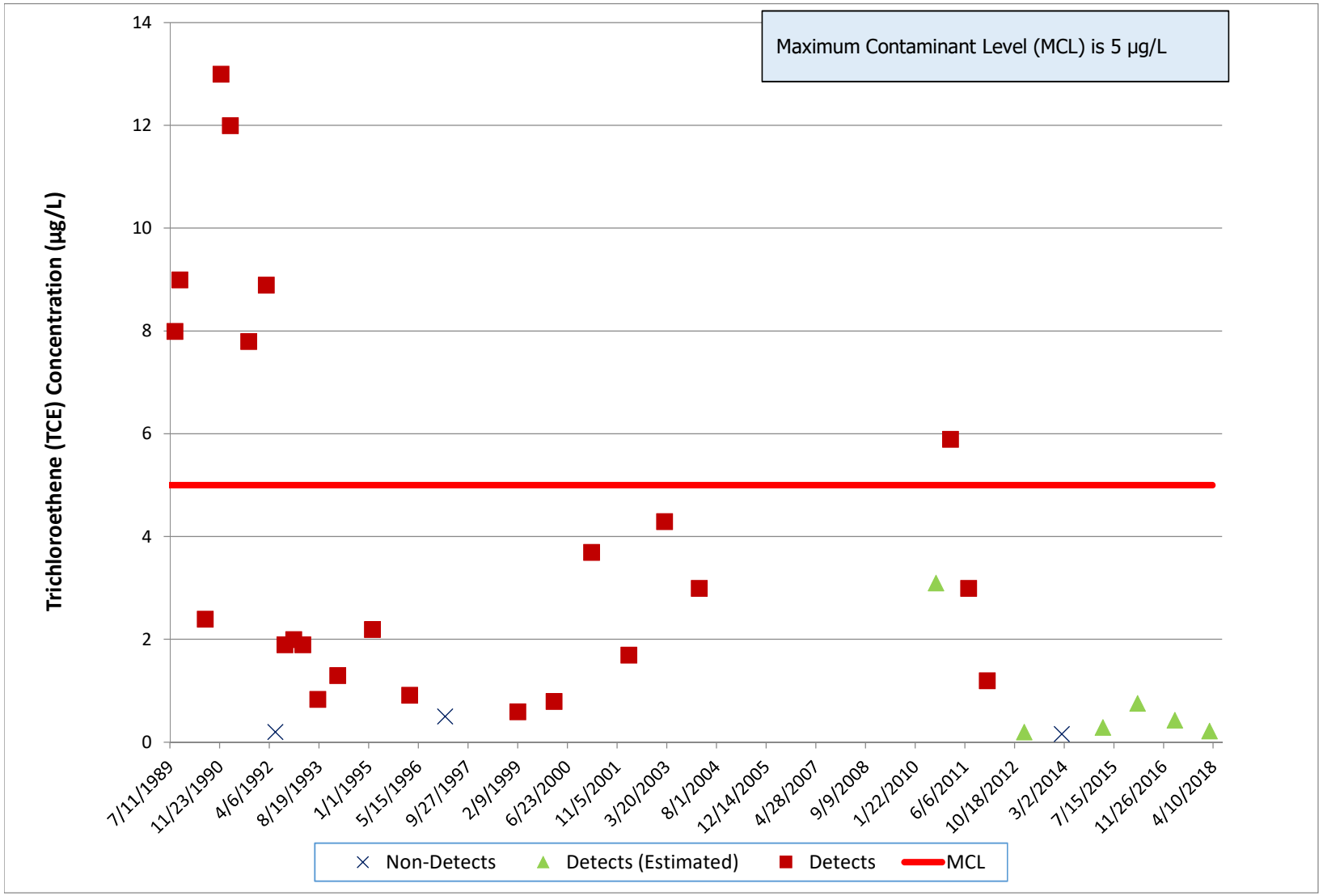
PZ-120, HMSA/PDU
Trichloroethene



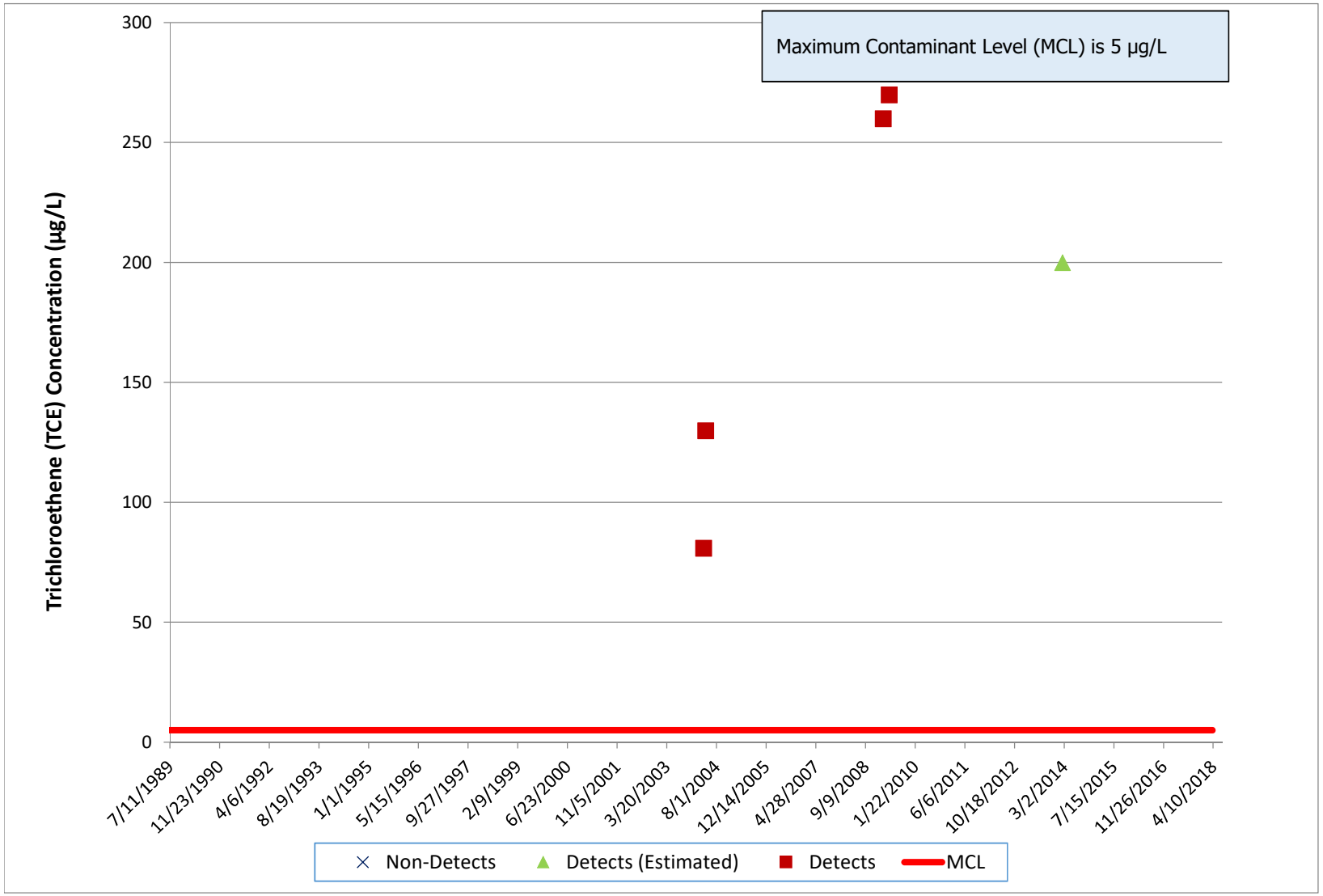
PZ-109, B4057/59/629
Trichloroethene



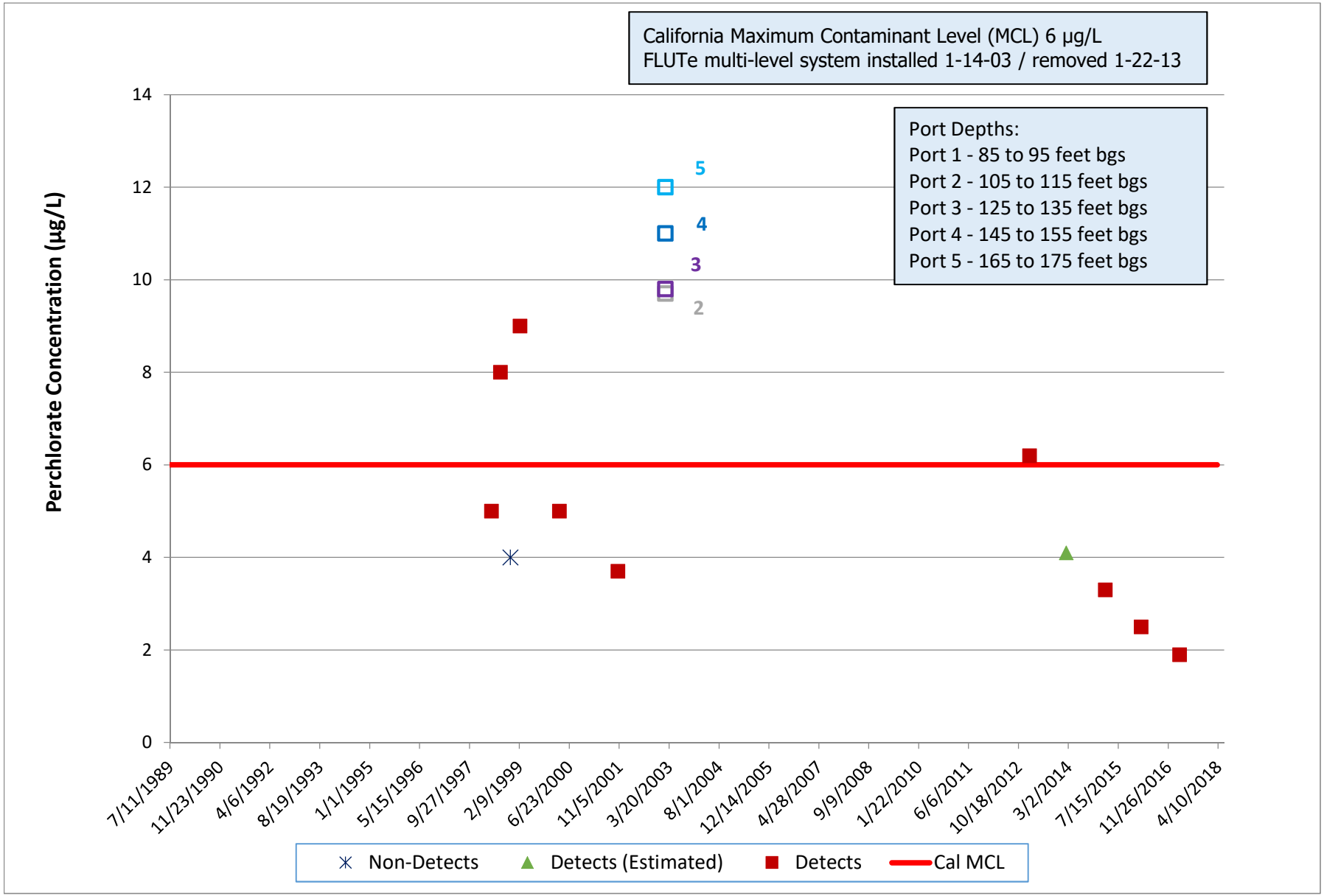
RD-14, OCY
Trichloroethene



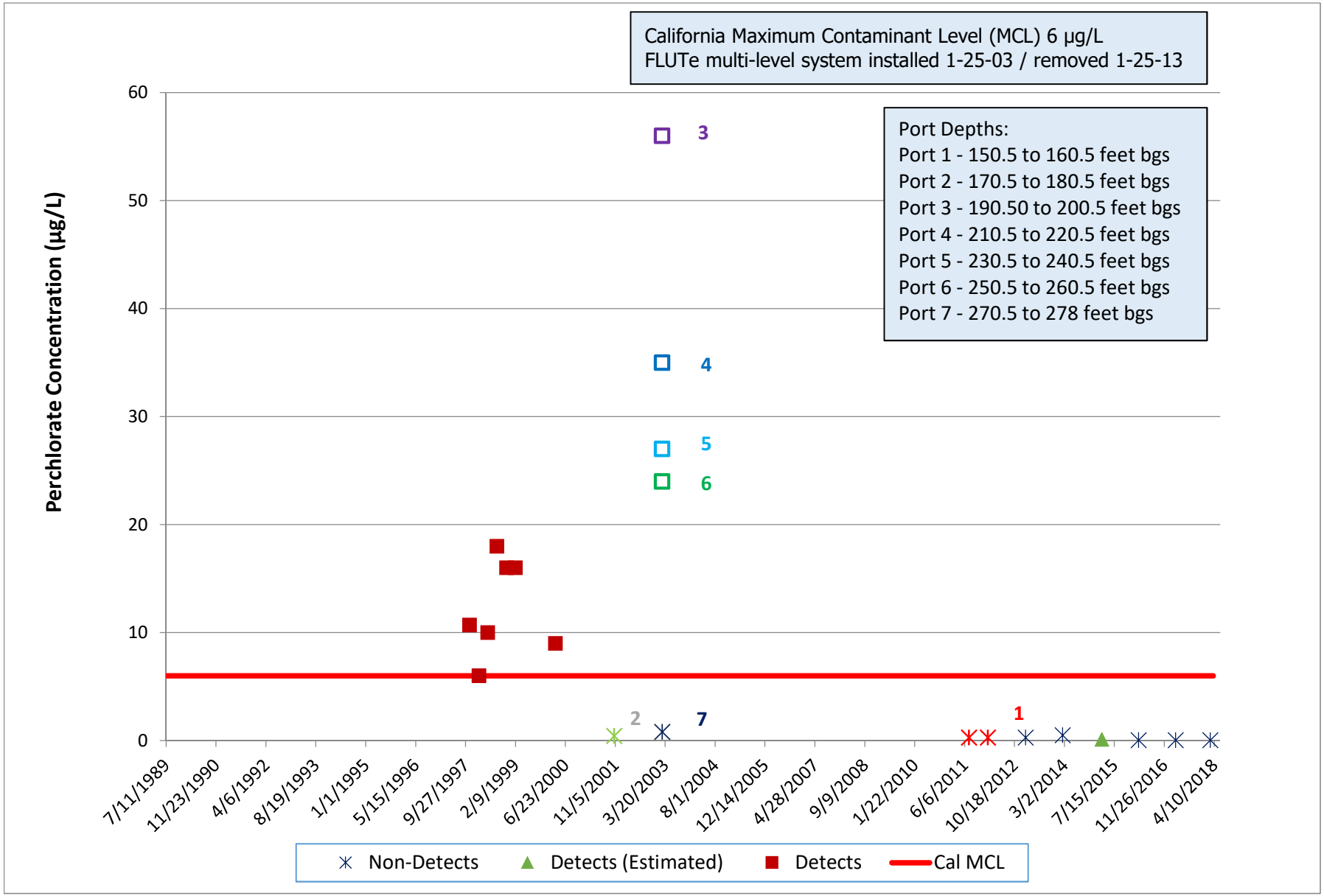
RD-91, Bldg 4100/4009
Trichloroethene



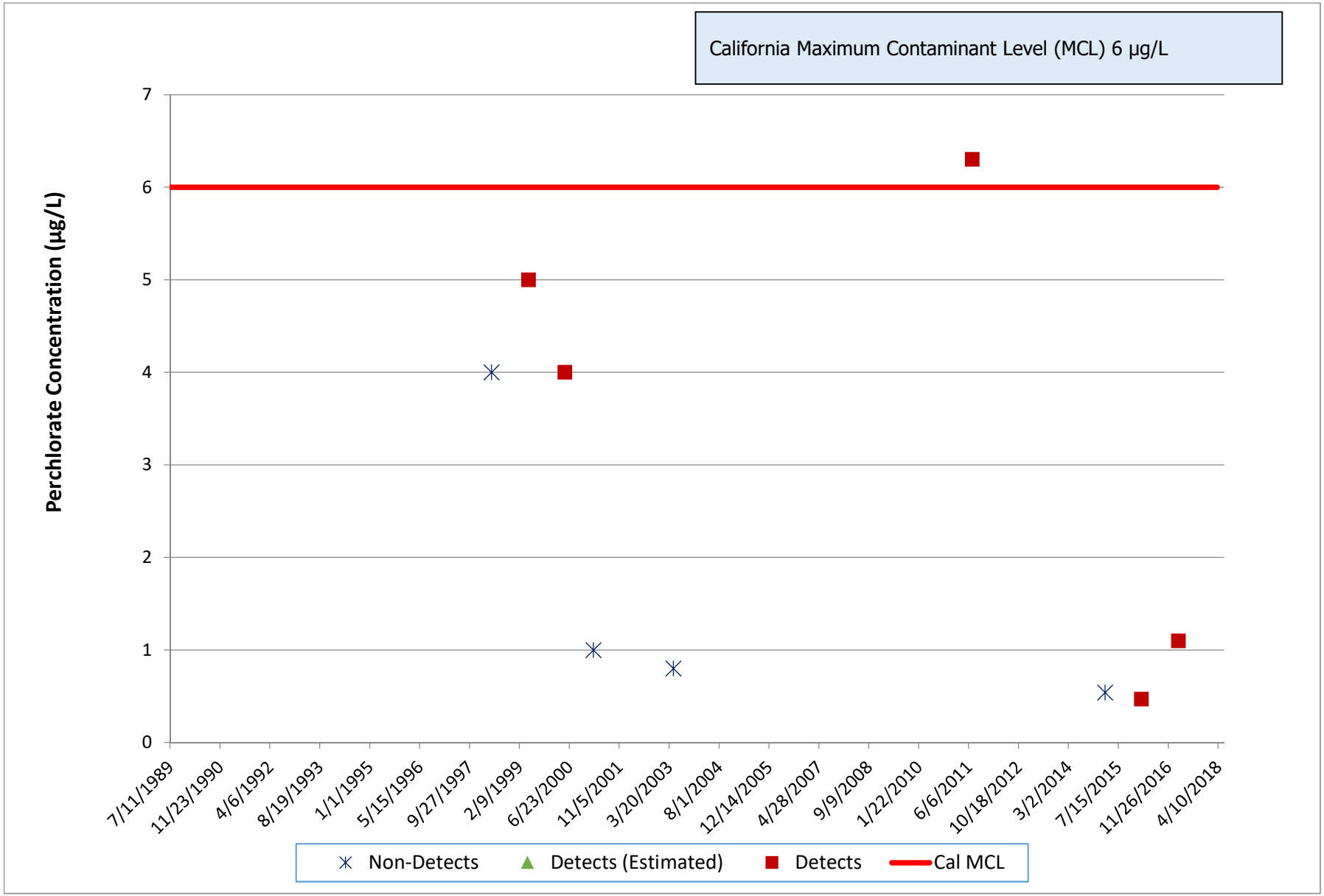
RD-21, FSDF/ESADA
Perchlorate



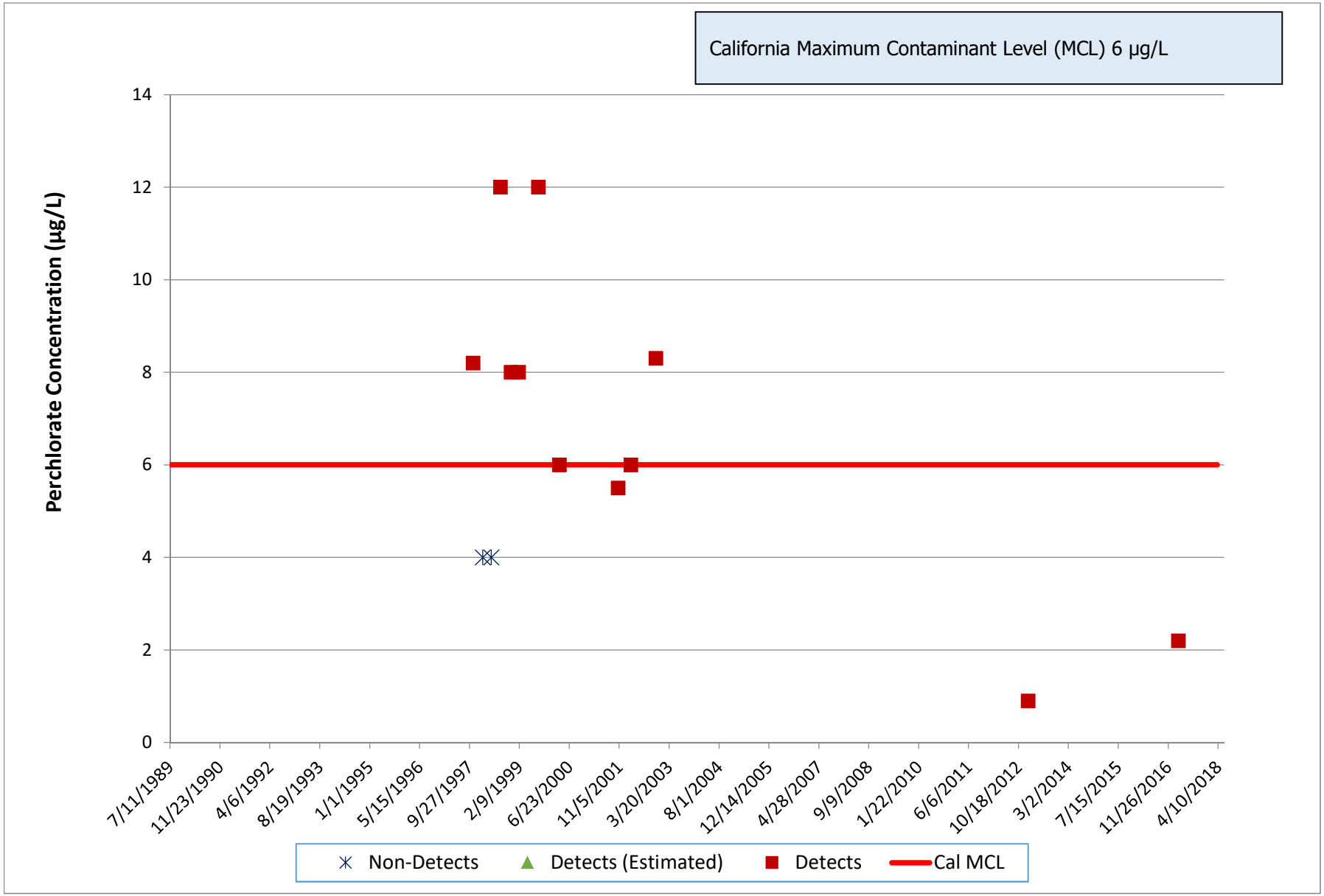
RD-54A, FSDF/ESADA
Perchlorate



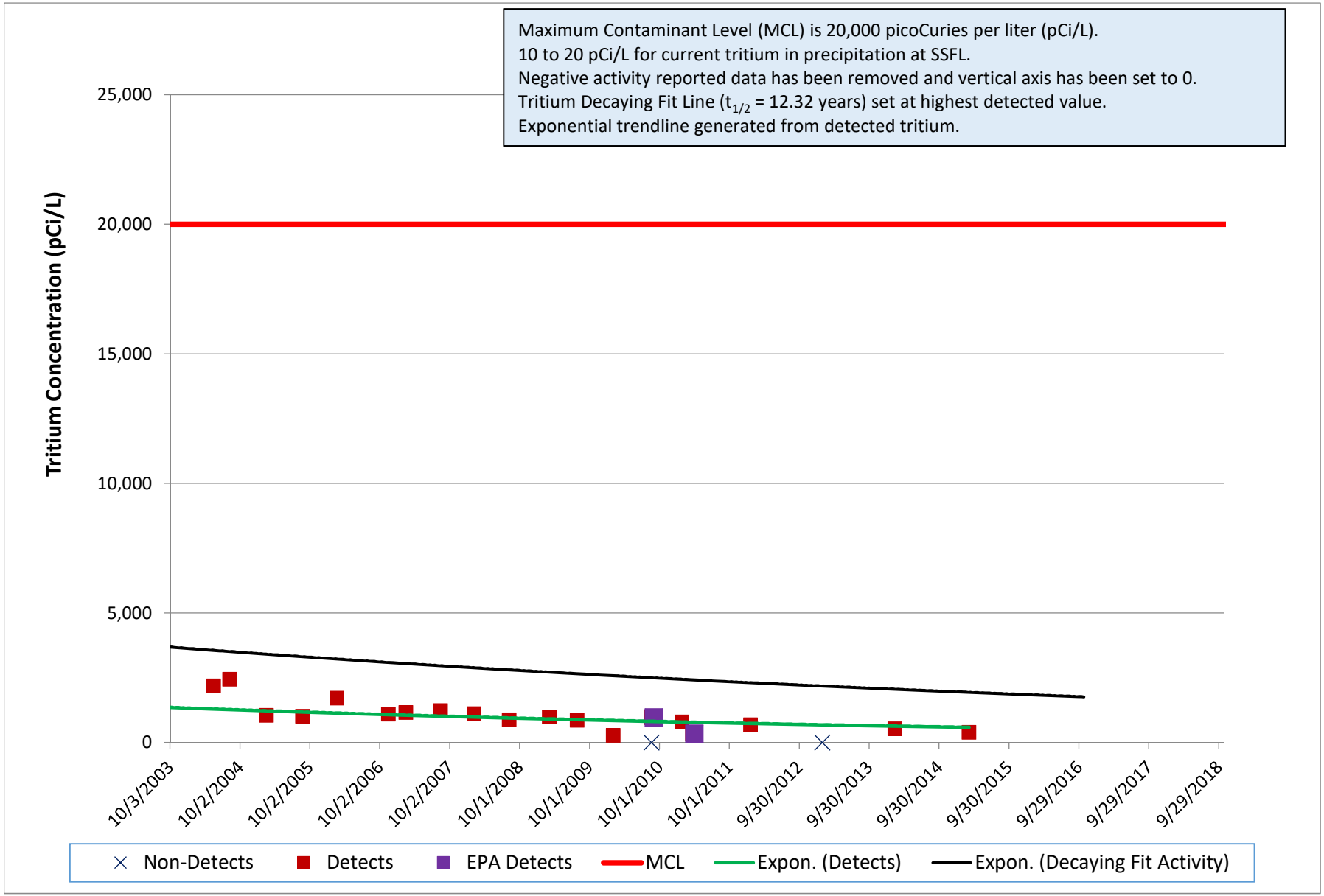
RS-18, FSDF/ESADA
Perchlorate



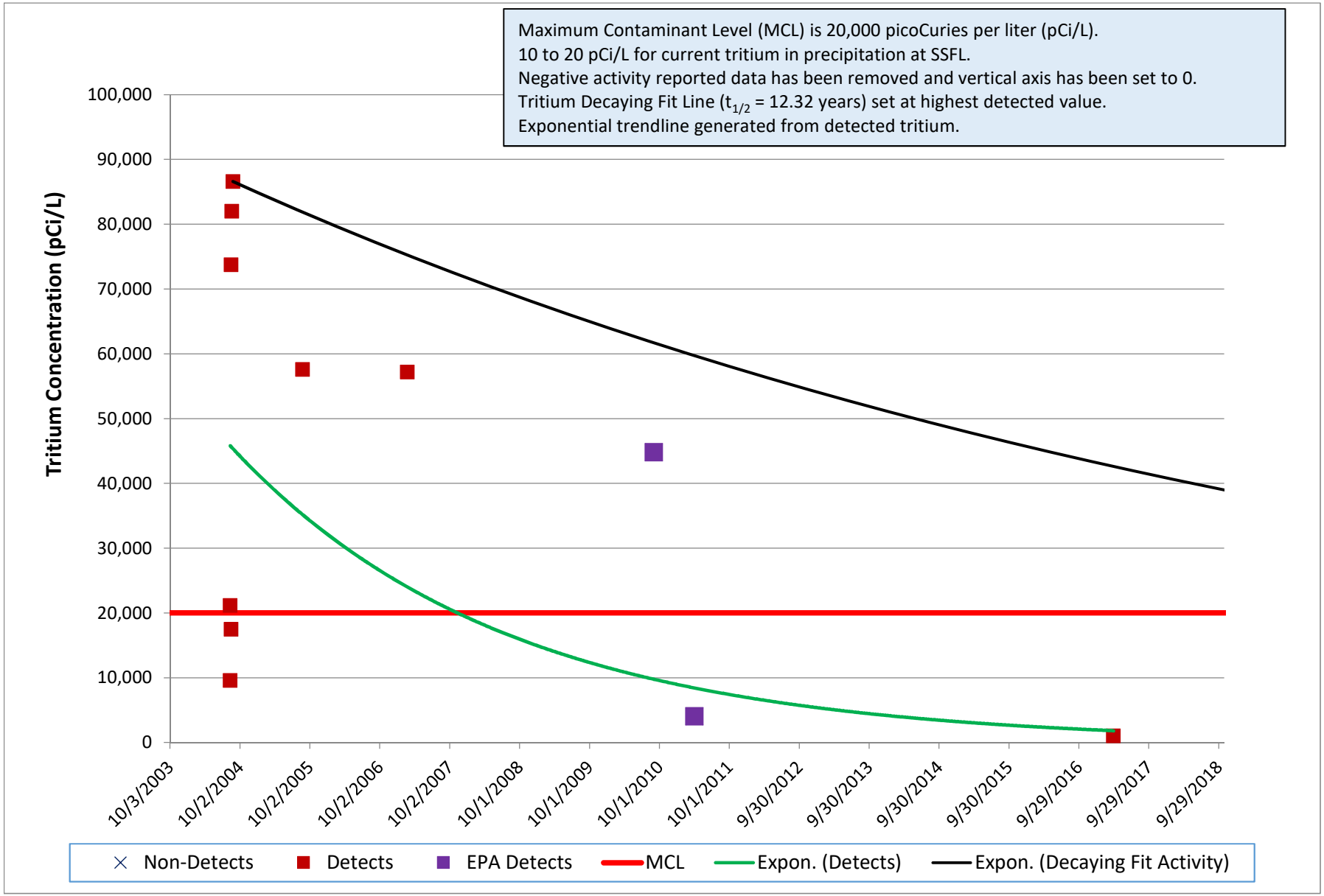
RS-54, FSDF/ESADA
Perchlorate



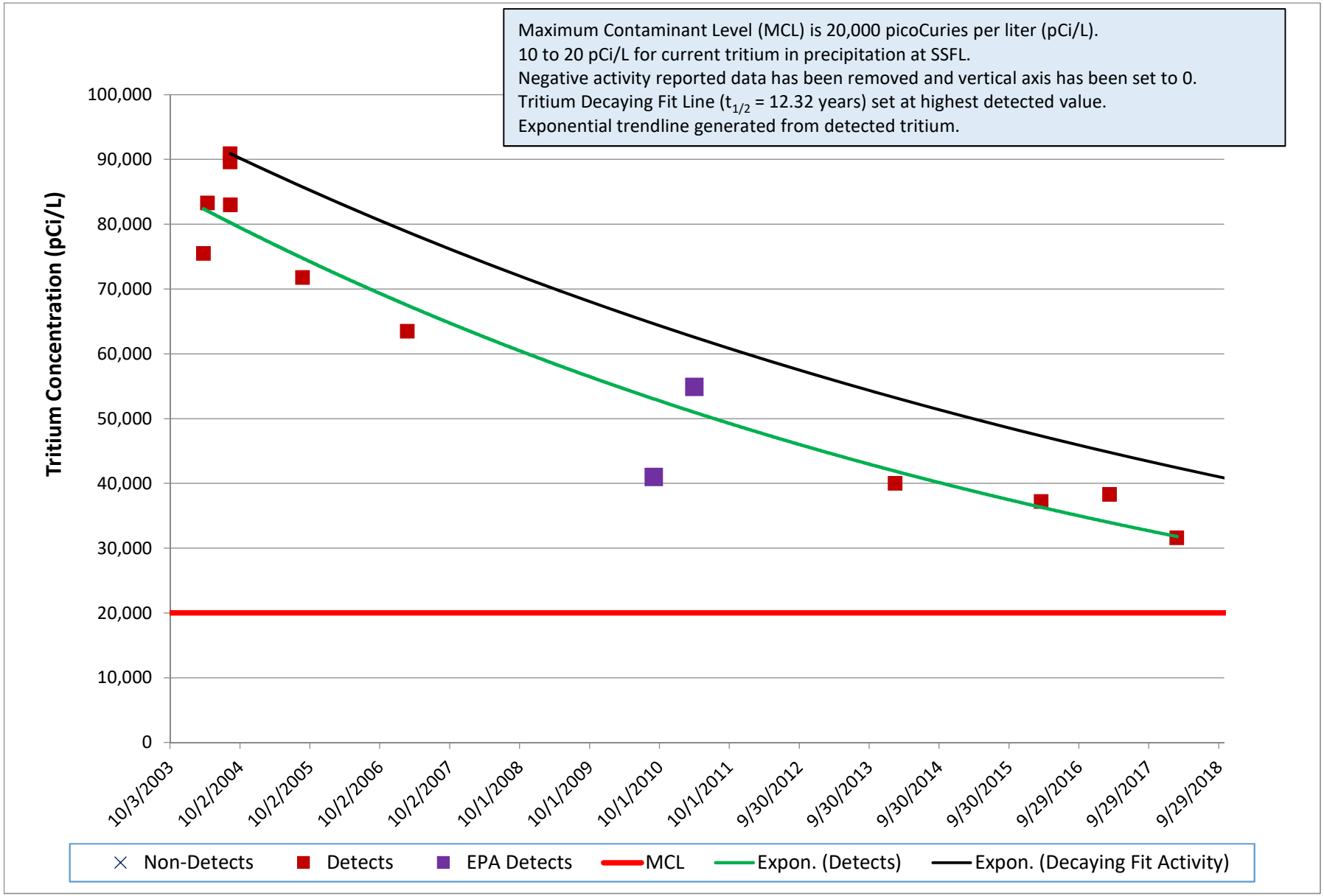
RD-34A, Tritium Plume
Tritium



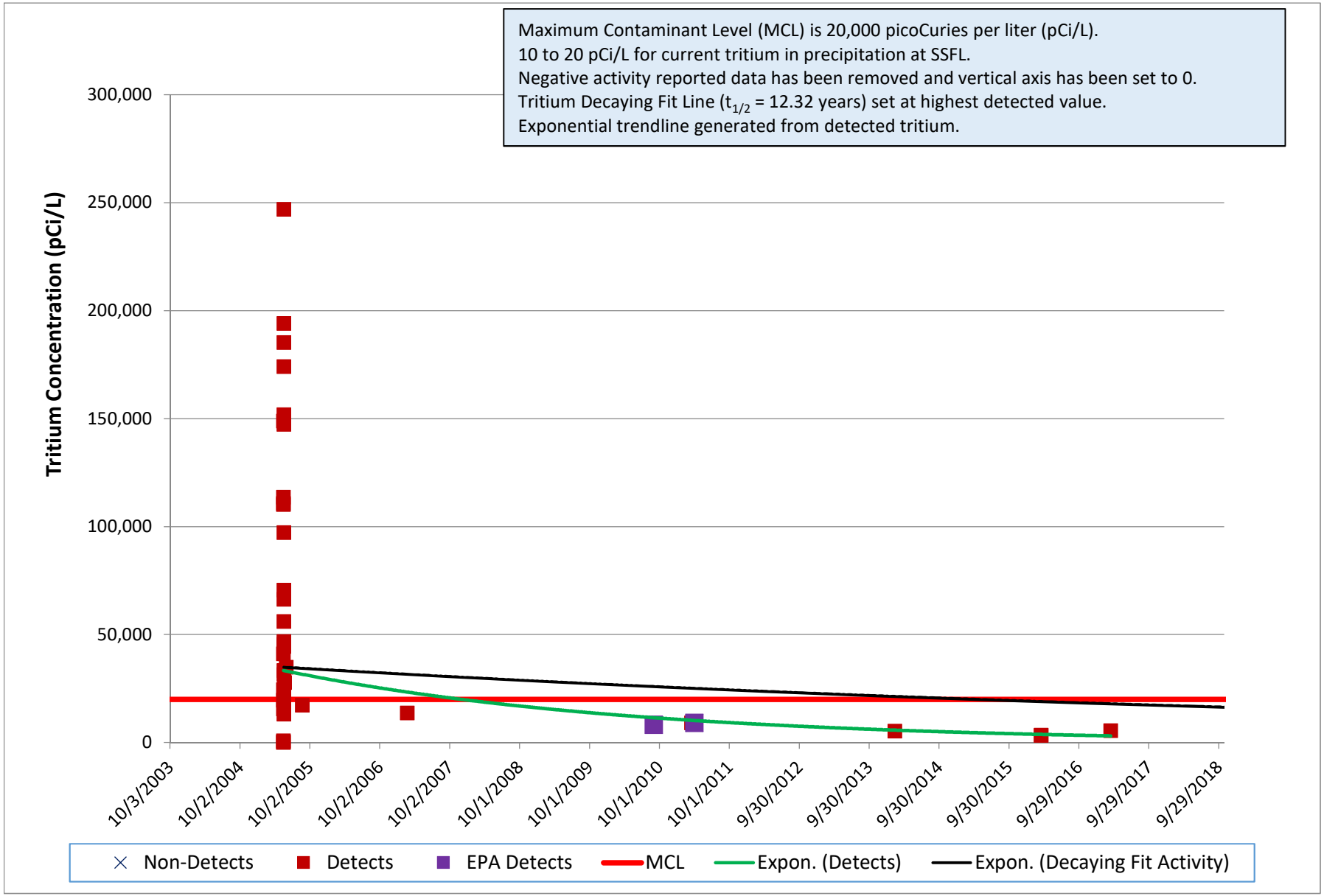
RD-88, Tritium Plume
Tritium



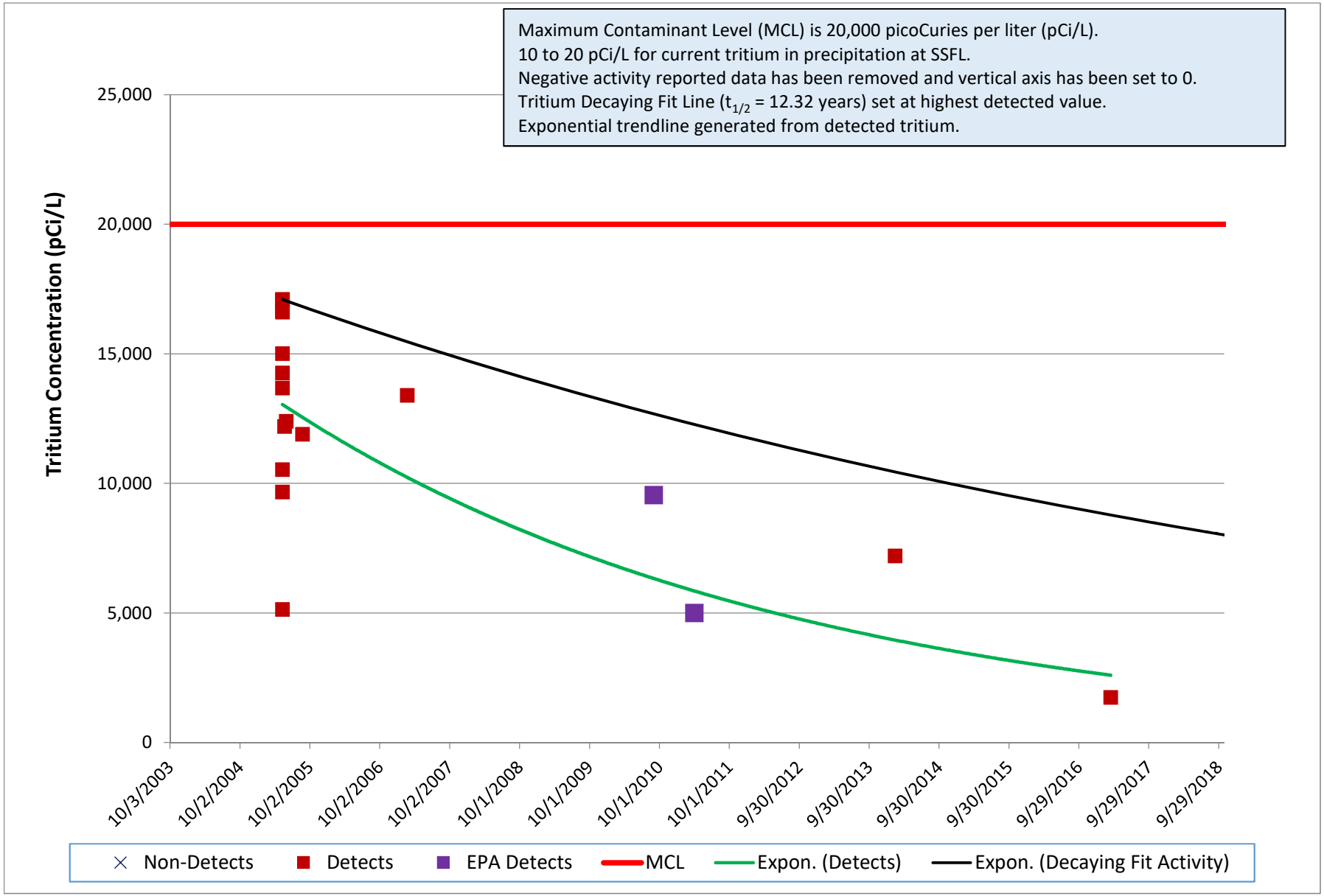
RD-90, Tritium Plume
Tritium



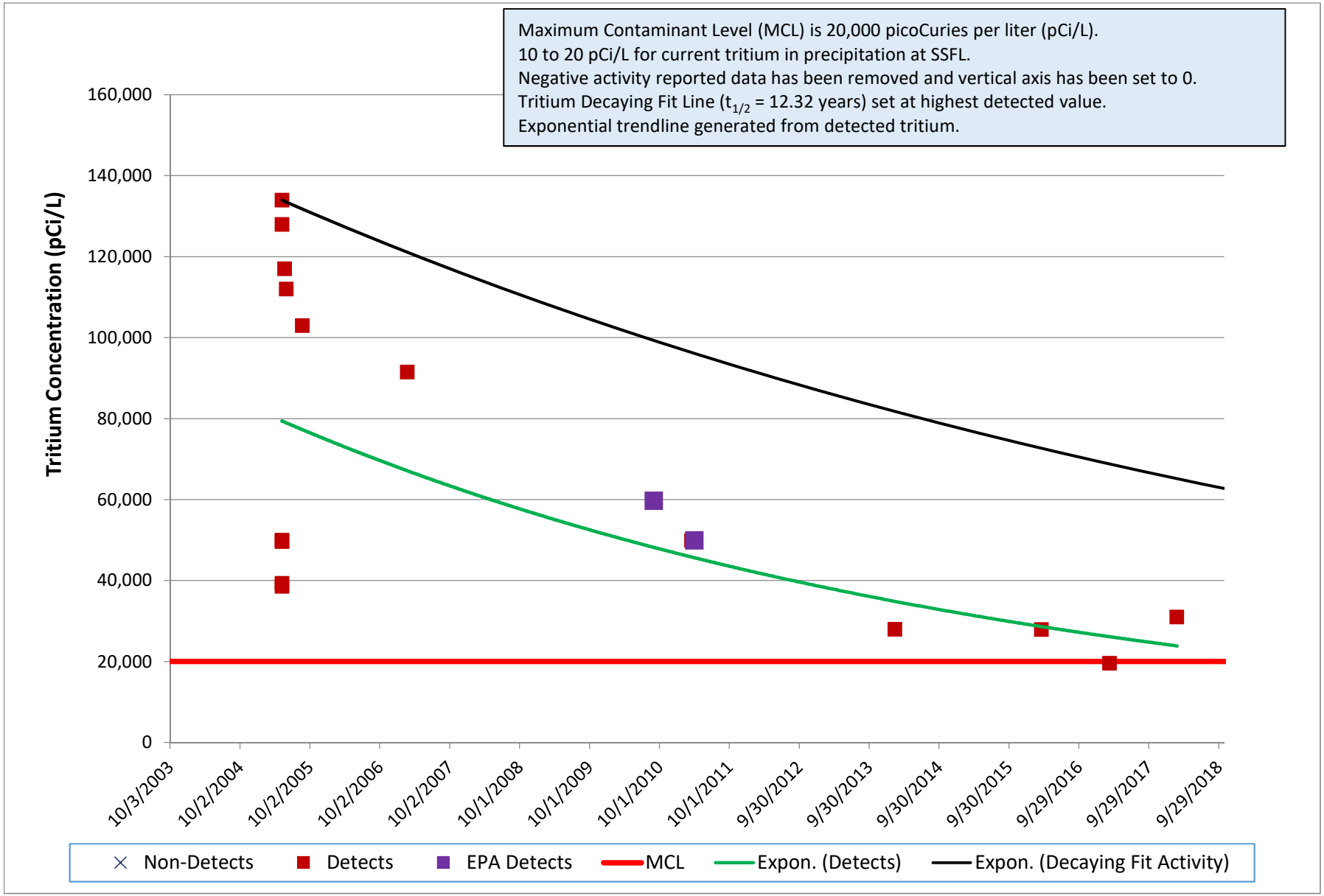
RD-93, Tritium Plume
Tritium



RD-94, Tritium Plume
Tritium



RD-95, Tritium Plume
Tritium



Appendix E
Quality Assurance Assessment

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Background

The following summarizes the inorganic, metals, organic, and radiochemical data validation completed for 20 United States Environmental Protection Agency (EPA) Level IV data packages containing results from the Santa Susana Field Laboratory (SSFL) Area IV in Ventura County, California. The data for this effort were acquired from sampling efforts completed from February 19, 2018, through August 22, 2018. The data for this summary was generated by GEL laboratories, LLC for SDG# 457885 and the remaining data for this summary was generated by Test America Laboratories.

The data were validated using the requirements and protocols outlined in the following documents and analytical methods:

- *Statement of Work Data Validation Services Santa Susana Field Laboratory Area IV, Ventura County, California.*
- *Report on Annual Groundwater Monitoring, 2009 Susana Field Laboratory, Simi Hills, Ventura County, California.*
    - *Haley & Aldrich, 2010a, Appendix A, Site-Wide Water Quality Sampling and Analysis Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* December.
    - *Haley & Aldrich, 2010b, Appendix B, Groundwater Monitoring, Quality Assurance Project Plan, Revision 1, Santa Susana Field Laboratory, Ventura County, California,* December.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Organic Superfund Methods Data Review,* OLEM 9355.0-136 EPA-540-R-2017-002, January.
- U.S. EPA, 2017, *U.S. EPA National Functional Guidelines for Inorganic Superfund Methods Data Review,* OLEM 9355.0-135 EPA-540-R-2017-001, January.
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).
- *Multi Agency Radiological Laboratory Analytical Protocols, MARLAP, Manual*, EPA 402-B-04-001A, July 2004.
- *Evaluation of Radiochemical Data Usability, ES/ER-MS-5,* April 1997.

The following provides an overview of the data set and findings of the data package validation effort.

Summary

The SSFL data set consists of 20 EPA Level IV sample delivery groups (SDGs) with a total of 89 water samples. SDGs 160-26903-1, 160-27060-1, 280-106860-1, and 280-106978-1 underwent a Level IV EPA validation and comprised more than 20% of the overall data per an analysis for this sampling effort. The remaining SDGs underwent an EPA Level III validation.

Table A-1 shows the number and type of samples collected for the SSFL Energy Technology Engineering Center (ETEC) groundwater 2018 sampling effort. Attachment 1 is a comprehensive sample ID table

compiled from the provided chain-of-custody forms.Table A-1. Samples collected for SSFL ETEC groundwater sampling, 2018.

Sample Type	Number of Samples
Field Samples	46 Samples (17 were designated on the chain-of-custody forms as MS/MSD)
Trip Blanks	10 Samples
Rinsates	15 Samples
Field Blank	1 Sample
Field Duplicates	17 Samples

The samples were analyzed for volatile organic compounds (VOCs), 1,4-dioxane, 1,2,3-trichloropropane, gasoline-range organics (GRO), diesel-range organics (DRO), dissolved and total metals including mercury, perchlorate, nitrate, fluoride, and radiochemical (RAD) analyses (tritium and total/dissolved for the remaining RAD analyses). Table A-2 shows the requested analyses, analytical methods, and number of samples analyzed for each analysis compiled from the chain-of-custody forms.

Table A-2. Summary of analyses for SSFL ETEC groundwater sampling, 2018.

Analysis	Method		Number of Samples Analyzed
Volatile Organic Compounds (VOCs)	USEPA SW-846 Method 8260B		71
1,4-Dioxane	USEPA SW-846 Method 8260B Selective Ion Monitoring (SIM)		19
1,2,3-Trichloropropane	EPA Method 524.2 SIM		10
Gasoline-Range Organics	USEPA SW-846 Method 8015B		28
Diesel-Range Organics	USEPA SW-846 Method 8015B		20
Perchlorate	USEPA SW-846 Method 6860		20
Nitrate as N	EPA Method 300.0		11
Fluoride	EPA Method 300.0		15
Metals (Total & Dissolved)	USEPA SW-846 Method 6010C USEPA SW-846 Method 6020A USEPA SW-846 Method 7470A		51 Total Metals 51 Dissolved Metals
Radiochemical Analyses (Total & Dissolved)	Isotopic U	Method A-01-R U	36 Total Isotopic U 36 Dissolved Isotopic U
	Gamma Spectroscopy	EPA Method 900.1	36 Total Gamma Spectroscopy 36 Dissolved Gamma Spectroscopy
	Gross Alpha/Beta	EPA Method 900.0	37 Total Gross Alpha/Gross Beta 37 Dissolved Gross Alpha/Beta
	Strontium-90 (Sr-90)	EPA Method 905.0	42Total Sr-90 42 Dissolved Sr-90
	Tritium	EPA Method 906.0	15 Tritium
	Radium-226 (Ra-226)	EPA Method 903.0	36 Total Ra-226 36 Dissolved Ra-226
	Radium-228	EPA Method 904.0	36 Total Ra-228

Analysis	Method		Number of Samples Analyzed
	(Ra-228)		36 Dissolved Ra-228

Data Quality Summary

Anions (Fluoride and Nitrate as N) by EPA Method 300.0:

The SSFL anions data set consists of 11 water samples analyzed for nitrate as N and 15 water samples analyzed for fluoride, which resulted in 26 data points. All 26 data points are considered usable for evaluating site conditions and indicated that:

- 10 data points for nitrate as N and 8 data points for fluoride (18 data points, 69.2% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered qualitative data.
- 7 fluoride and 1 nitrate data points (5 data points, 30.8% of the total) were qualified with a "J" validation flag and can be considered as quantitative data.

Perchlorate by USEPA SW-846 Method 6860:

The SSFL perchlorate data set consists of 20 water samples. All 20 data points are considered usable for evaluating site conditions and indicated that:

- 15 perchlorate data points (75% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered qualitative data.
- 5 perchlorate data points (25% of the total) were qualified with a "UJ", "J", or "J-"validation flag and can be considered quantitative data.

Total and Dissolved Metals by USEPA SW-846 Methods 6010C, 6020A, and 7470A:

The SSFL metals data set consists of 51 water samples analyzed for total metals and dissolved metals and resulted in 2,754 data points. All 2,754 data points are considered usable for evaluating site conditions and indicated that:

- 2,265 total and dissolved metals data points (82.2% of the total) were either qualified with a "U" validation flag due to blank detections, were non-detect, or were detected in the samples and can be considered as qualitative data.
- 489 total and dissolved metals data points (17.8% of the total) were qualified with a "UJ", "J+", "J-", or "J" validation flag and can be considered as quantitative data.

Gasoline-Range Organics (GRO) and Diesel-Range Organics (DRO) by USEPA SW-846 Method 8015B:

The SSFL GRO and DRO data set consists of 28 GRO samples and 20 DRO samples, which resulted in 48 data points. All 48 data points are considered usable for evaluating site conditions and indicated that:

- 22 GRO data points and 10 DRO data points (66.7% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered as qualitative data.
- 11 DRO and 5 GRO data points (33.3% of the total) were qualified with a "J" or "UJ" validation flag and can be considered as quantitative data.

1,4-Dioxane by USEPA SW-846 Method 8260B SIM and 1,2,3-Trichloropropane by EPA Method 524.2 (SIM):

The SSFL 1,4-dioxane data set consists of 19 water samples and the 1,2,3-trichloropropane data set consists of10 water samples. All 19 data points are considered usable for evaluating site conditions and indicated that:

- 10 data points for 1,2,3-trichloropropane (100% of the total) were non-detect and can be considered as qualitative data.
- 9 data points for 1,4-dioxane results (47.4% of the total) were either non-detect and identified as "U" or were evaluated and remain unqualified. These results can be considered as qualitative data.
- 10 data points for 1,4-dioxane results (52.6% of the total) were qualified with a "J" or "UJ" and can be considered as quantitative data.

Volatile Organic Compounds by USEPA SW-846 Method 8260B:

The SSFL VOC data set consists of 71 water samples, which resulted in 1,491 data points. All 1,491 data points are considered usable for evaluating site conditions and indicated that:

- 1,412 data points (94.7% of the total) were non-detect, qualified "U" due to method, trip, or field blank detections, or were detections above the quantitation limit and can be considered qualitative data.
- 79 data points (5.3% of the total) were qualified "UJ" or "J" and can be considered quantitative data.

Radiochemical Analyses:

The SSFL radiochemical data set consists of 36 samples for total and dissolved isotopic uranium and strontium-90 (Sr-90), 36 samples for total and dissolved gamma spectroscopy, 37 samples for total and dissolved gross alpha/gross beta, 42 samples for total and dissolved strontium-90 (Sr-90), 15 samples for tritium, and 36 samples for total and dissolved radium-226 (Ra-226) and radium-228 (Ra-228), which resulted in 1,632 data points. All 1,632 data points are considered usable for evaluating site conditions and indicated that:

- 1,607 data points (98.5% of the total) were statistical non-detects or were considered as truly present in the samples and can be considered qualitative data.
- 25 data points (1.5% of the total) were qualified with a "UJ" or "J" validation flag and can be considered as quantitative data.

Trip Blanks and Field Blanks:

Ten trip blank samples and one field blank sample were collected for the SSFL ETEC groundwater 2018 sampling effort and are listed in Table A-3.

Table A-3. Trip/field blanks for SSFL ETEC groundwater sampling, 2018.

Sample Delivery Group (SDG)	Sample ID	Analysis	Quality Control (QC) Type
280-106660-1	DD-139_022218_78_L	VOC	Trip Blank
280-106726-1	DD-144_022218_78_L	VOC	Trip Blank
280-106848-1	DS-46_022718_78_L	VOC, 1,4-Dioxane, GRO	Trip Blank
280-106589-1	PZ-108_021918_78_L	VOC and GRO	Trip Blank
280-106810-1	PZ-120_022618_78_L	VOC and 1,4 Dioxane	Trip Blank
280-106620-1	RD-33B_022018_78_L	VOC and GRO	Trip Blank
280-106976-1	RD-34B_030118_78_L	VOC, GRO, 1,4-Dioxane,and 1,2,3-Trichloropropane	Trip Blank
	RD-34B_030118_19_L	VOC, Metals, Perchlorate, GRO, DRO, RAD Analyses, Anions, 1,4-Dioxane, 1,2,3-Trichloropropane, & Tritium	Field Blank
280-106860-1	RD-98_022818_78_L	VOC and GRO	Trip Blank
280-113433-1	RD-33_082118_78_L	VOC, GRO, 1,4-Dioxane,and 1,2,3-Trichloropropane	Trip Blank
280-113521-1	RD-33C_082218_78_L	VOC, GRO, 1,4-Dioxane,and 1,2,3-Trichloropropane	Trip Blank

The following compounds were detected in the trip blank and field blank samples:

- GRO in samples RD-34B_030118_78_L, RD-33B_022018_78_L, DS-46_022718_78_L, and RD-98_022818_78_L.
- Acetone, U-233/234, total and dissolved boron, total and dissolved calcium, and total strontium in RD-34B_030118_19_L.
- Acetone and GRO in RD_33_082118_78_L.

No data qualification has been warranted based on these detections.

Field Duplicates:

Seventeen pairs of field duplicates were collected during the SSFL ETEC groundwater 2018 sampling effort and are listed in the following table.

Table A-4. Field duplicates for SSFL ETEC groundwater sampling, 2018.

SDG#	Parent ID	Field Duplicate ID	Analysis
280-106589-1	DD-145_021918_01_L	DD-145_021918_36_L	GRO
	RD-20_022018_01_L	RD-20_022018_36_L	Nitrate
160-26984-1	DS-47_022318_01_L	DS-47_022318_36_L	Rad Suite
	RD-90_022218_01_L	RD-90_022218_36_L	Tritium
160-27060-1 (RAD) 280-106860-1 (VOCs)	RD-59C_022818_01_L	RD-59C_022818_36_L	RAD Analyses and VOC

SDG#	Parent ID	Field Duplicate ID	Analysis
280-106620-1	RD-33B_022018_01_L	RD-33B_022018_36_L	Perchlorate
	RD-63_022118_01_L	RD-63_022118_36_L	VOC and GRO
	RD-96_022118_01_L	RD-96_022118_36_L	Metals and DRO
280-106660-1	DD-139_022218_01_L	DD-139_022218_36_L	VOC
280-106810-1	DD-143_022618_01_L	DD-143_022618_36_L	Metals
280-106848-1	DD-140_022718_01_L	DD-140_022718_36_L	VOC
280-106860-1	RD-59B_022818_01_L	RD-59B_022818_36_L	Metals and Fluoride
280-106976-1	RD-14_030218_01_L	RD-14_030218_36_L	1,2,3-Trichloropropane
	RD-34A_030218_01_L	RD-34A_030218_36_L	1,4-Dioxane
160-32091-1	RD-59A_082018_01_L	RD-59A_082018_36_L	Sr-90
160-30331-1 (RAD) 280-113433-1 (Remaining Analyses)	RD-33A-082118_01_L	RD-33A-082118_36_L	RAD Analyses Including Tritium, Nitrate, Fluoride, Perchlorate, Metals, GRO, DRO, VOCs, 1,4-Dioxane, and 1,2,3-Trichloropropane
457885 (GEL)	RD-59A_082018_03_G	RD-59A_082018_03_36_G	Sr-90

The field duplicate precision for perchlorate (42.8% relative percent difference, RPD) in field duplicate pair RD-33B_022018_01_L/ RD-33B_022018_36_L exceeded the 35% RPD criterion. The remaining field duplicate precision criteria were met.

Data Validation Qualifications

Qualifications were assigned in accordance with the *U.S. EPA Contract Laboratory Program National Functional Guidelines* and resulted from preparation and chain-of-custody issues; poor initial and continuing calibration criteria; positive blank detections; poor laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS), matrix spike duplicate (MSD), and serial dilution sample (SDS) performance; and results reported below the quantitation limits. Table A-5 summarizes the findings and data qualifications assigned to SSFL ETEC Groundwater 2018 data results. Please refer to Attachment B for definitions of the data validation qualifiers.

Table A-5. Summary of data validation qualifications for SSFL ETEC groundwater sampling, 2018.

Analyte	**Total # of**	**Analyte**	**Total # of**
Nitrate as N	11	10	"U" or No Qualification
		1	**J**
Fluoride	15	8	"U" or No Qualification
		7	**J**
Perchlorate	20	15	"U" or No Qualification
		2	UJ
		1	**J-**
		2	**J**
Metals	2754	2265	"U" or No Qualification
		13	**UJ**
		25	**J+**
		1	**J-**
		450	**J**
GRO	28	22	"U" or No Qualification
		5	**J**
		1	**UJ**
DRO	20	10	"U" or No Qualification
		10	**J**
1,2,3-Trichloropropane	10	10	"U"
1,4-Dioxane	19	9	"U" or No Qualification
		5	**UJ**
		5	**J**
VOCs	1491	1412	"U" or No Qualification
		41	**UJ**
		38	**J**
Radiochemical Data (including Tritium)	1632	1607	"U" or Positively Detected in the Sample
		20	**UJ**
		5	**J**

Data Review Process

Data produced by the analytical laboratories were subject to multiple review steps to coincide with the start of distinct tasks. These steps were performed in a timely manner to ensure appropriate feedback and correction of errors. These steps included:

- Cross-reference check of sample chain-of-custody documents against the laboratory acknowledgement of sample receipt form. The laboratory acknowledgement of sample receipt was typically transmitted to the data manager via e-mail 2 to 3 days after sample receipt and log-in and included a summary of the requested analyses to be performed per sample. Sample log-in errors were identified and corrected at this step.

- Tracking of sample collection, receipt, and laboratory SDG numbers on a sample tracking spreadsheet. This spreadsheet also included field QC sample information and well sample location coordinates.

- Laboratory consultation with the project chemists on data quality issues during sample analyses such as missed holding times, poor spike recoveries, etc. These issues were discussed between the project chemists and the laboratory and were resolved based on technical merit and determined if usable in the evaluation.

Upon receipt of the laboratory report (delivered via e-mail), a preliminary review of the data was performed. This review consisted of:

- Reconciliation of the reported analyses against the analyses that were requested on the chain-of-custody documents.

- Review of the laboratory case narratives. The case narrative identified and explained quality issues encountered during the analysis of the samples. Quality issues may include (but not be limited to) expired holding times, poor spike recoveries in matrix or batch-specific QC samples, instrument calibration exceedances, and blank contamination.

- Review of the laboratory-specific QC data. These data were provided by the laboratory in summary form. Any unanticipated deviations from the project or method-specific criteria were reconciled with the laboratory at this stage.

Data Quality Indicators

This section summarizes the validation performed. Individual SDG validation reports with specific sample details are provided in Attachment 2.

Achievement of the Data Quality Objectives (DQOs) was determined in part by the use of Data Quality Indicators (DQIs). The DQIs for measurement data are expressed in terms of what are collectively referred to as the PARCCS parameters (Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity). The DQIs provide a mechanism for ongoing control to evaluate and measure data quality throughout the project. These criteria are defined in the sections below.

Precision

Precision is the measurement of the ability to obtain the same value on re-analysis of a sample through the entire analytical process. The closer the measurement results, the greater the precision. Precision has

nothing to do with accuracy or true values of the sample. Instead, it is focused on random errors inherent in the analysis that stem from the measurement process and are compounded by the non-homogeneous nature of some samples. Precision is measured by analyzing two portions of the sample (sample and duplicate) and then comparing the results. This comparison can be expressed in terms of relative percent difference (RPD). RPD is calculated as the absolute difference between the two measurements divided by the average of the two measurements.

$$\mathbf{RPD = [(A-B)/\frac{A+B}{2}] \times 100}$$

A condition with this formula is that it depends on the average of the two measurements, and the magnitude of the calculated RPD is intimately linked to the magnitude of the results. When sample results are close to the reporting limit (RL), the RPD is greater but does not necessarily indicate that the precision is out of control limits, just that the sample concentrations are low.

RPD as a measure of precision works very well in those cases where the same level of analyte is present in all samples; however, it does not work well as a quantitative tool when varying levels are present. Another option that is used for evaluating the differences between sample results that are close to the RL is calculating the absolute difference between the results. In this situation, the difference between the sample results is compared to the RL and if the difference is greater, the sample results are qualified as estimated "J/UJ." Sample results are also qualified as estimated “J/UJ” if the RPD is outside of criteria.

Because of the limitations with the use of RPDs for field duplicate precision evaluation, precision is also calculated on spike samples, either on an MS and MSD or on an LCS/LCSD. For spike samples, a known concentration of analyte has been added to each sample and evaluations of RPD can be made that are more applicable to variations in environmental measurements. The drawback is that the precision measurement is applicable only to the particular spike level used.

For the groundwater samples, precision was evaluated by reviewing RPD results for MS/MSDs, LCS/LCSDs, laboratory duplicates, and field duplicates.

Laboratory RPD control limits are presented in the Water Quality Sampling and Analysis Plan (WQSAP) (Haley & Aldrich 2010) or are laboratory specific. For laboratory duplicates, if one or both of the sample results were less than five times the RL, a control limit of the absolute difference value equal to the RL was used for comparison. The field duplicate RPD criterion is 35%.

Based on laboratory and/or field duplicate precision criteria during the validation process, qualifiers were applied to applicable sample results.

Accuracy

Accuracy is a concept from quantitative analysis that attempts to address the question of how close the analytical result is to the true value of the analyte in the sample. Accuracy is determined through a spike procedure, where a known amount of the target analyte is added to a portion of the sample and then the sample and the spiked sample are analyzed. The quantitative measure of accuracy is percent recovery (%R), calculated as follows:

$$\text{Percent Recovery} = \frac{(\text{Total Analyte Found} - \text{Analyte Originally Present})}{\text{Analyte Added}} \times 100$$

Each measurement performed on a sample is subject to random and systematic error. Accuracy is related to the systematic error. Attempts to assess systematic error are always complicated by the inherent random error of the measurement.

Analytical accuracy for the entire data collection activity is difficult to assess because several sources of error exist. Errors can be introduced by any of the following:

- Sampling procedure
- Field contamination
- Sample preservation and handling
- Sample matrix
- Sample preparation
- Analytical techniques.

Accuracy is maintained to the extent possible by adhering to the EPA method and approved field and analytical standard operating procedures.

The following QC samples are used to assess laboratory accuracy:

- Matrix Spikes: These are samples with a known amount of a target analyte added to them. Analysis of the sample that has been spiked and comparison with the results from the unspiked sample (background) gives information about the ability of the test procedure to generate a correct result from the sample.
- Post-Digestion Spikes: Post-digestion spikes are performed after the sample has been prepared and is ready for analysis. These are also termed "analytical spikes." The technique is used in conjunction with an MS to provide data that can separate interferences produced as part of the sample preparation from interferences that are innate qualities of the sample.
- Laboratory Control Samples: LCSs consist of a portion of analyte-free water spiked with target analytes at a known concentration.
- Surrogates: Surrogate recovery is a QC measure limited to use in organics analysis. Surrogates are compounds added to every sample at the beginning of the sample preparation to monitor the success of the sample preparation and analytical procedures on an individual sample basis. Individual compounds used as surrogates are selected based on their ability to mimic the behavior of specific target analytes held to be particularly sensitive to the sample preparation manipulations.
- Interference Check Samples: Interference check sample analysis is a QC measure unique to metals analysis using inductively coupled plasma atomic emission spectrometry. This QC sample verifies the analytical instrument's ability to overcome interferences typical of those found in samples.
- Calibrations: Method requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data for metals. Initial calibration

demonstrates that the instrument is capable of acceptable performance at the beginning of the analytical run. Continuing calibrations demonstrate that the initial calibration is still valid by checking the performance of the instrument on a continuing basis.

- Internal Standards: Internal standards measure the gas chromatograph/ mass spectrometer sensitivity and response stability during each analysis.

- Serial Dilution: Serial dilutions are performed on at least one sample from every batch of analyses for metals to determine if physical or chemical interferences exist in the analyte determinations.

For the groundwater samples, accuracy was evaluated by reviewing the %R values and relative response factors of initial and continuing calibration (percent difference or percent drift [%D] for organic analyses), the initial and continuing calibration recoveries for inorganic analyses, internal standards, surrogate spikes (organic analyses only), MS/MSD, LCS/LCSD, inductively coupled plasma (ICP) interferences, and by performing serial dilution checks during metals analyses, in conjunction with method blank, calibration blank, equipment rinsate blank, and trip blank results. These QC results assist in identifying the type and magnitude of effects that may have contributed to system error introduced from field and/or laboratory procedures.

Qualifiers were applied to applicable sample results during the validation process based on laboratory accuracy results. Results were qualified based on calibrations, surrogates, internal standards, ICP serial dilutions, LCS/LCSD recoveries, and MS/MSD recoveries.

Sample preservation, handling, and holding times are additional measures of accuracy of the data. Holding times are defined as the amount of time that elapses from collection of the sample in the field to the start of the analysis. Preservation is defined as techniques used to maintain the target analytes at concentrations representative of the source sampled.

In summary, sample results that have been qualified as estimated "J, J+, J-, or UJ" due to accuracy criteria are usable for project decisions. No sample results were rejected.

Blank Contamination

Blanks are used to determine the level of laboratory and field contamination introduced into the samples, independent of the level of target analytes found in the sample source. Sources of sample contamination can include the containers and equipment used to collect the sample; preservatives added to the sample; cross contamination from other samples in transport coolers and laboratory sample storage refrigerators; standards used to calibrate instruments; glassware and reagents used to prepare samples for analysis; airborne contamination in the laboratory preparation area; and the analytical instrument sample introduction equipment. Each analyte group has its own particular suite of common laboratory contaminants. Active measures must be performed to continually measure the ambient contamination level and steps taken to discover the source of the contamination and to eliminate or minimize the levels. Random spot contamination can also occur from analytes that are not common laboratory problems but that can arise as a problem for a specific project or over a short period of time. Field blanks, equipment blanks, trip blanks, and laboratory method blanks are analyzed to identify possible sources of contamination.

The data validation reports discuss the specific results that were qualified as non-detect “U” based on field and laboratory blank contamination.

Representativeness, Comparability, and Sensitivity

Representativeness, comparability, and sensitivity are achieved by using EPA-approved sampling procedures and analytical methodologies. By following the procedures described in the WQSAP and Appendix B (Haley & Aldrich 2010a, 2010b) for this sampling event and future sampling events, sample analysis should yield results representative of environmental conditions at the time of sampling. Similarly, reasonable comparability of analytical results for this and future sampling events can be achieved if approved EPA analytical methods and standardized reporting units are employed.

Representativeness

Representativeness is a qualitative term that expresses the degree to which the sample data accurately and precisely represent the environmental conditions corresponding to the location and depth interval of sample collection. Requirements and procedures for sample collection are designed to maximize sample representativeness.

Representativeness also can be monitored by reviewing field documentation and/or performing field audits. For this report, a detailed review was performed on the chain-of-custody forms, laboratory sample confirmation logs, and data validation packages.

The most significant measure of representativeness is the accuracy of the sampling network and selection of appropriate locations and depths, etc. Field sampling accuracy was attained through adherence to the approved WQSAP and Appendix B (Haley & Aldrich 2010a, 2010b) for sample location and collection and by using approved standard operating procedures for field data collection. The data should represent, as near as possible, the actual field conditions at the time of sampling.

Representativeness has been achieved by the performed field work and laboratory analyses. The analytical data generated are viewed to be a representative characterization of the project area. No sample results were rejected.

Comparability

Comparability is a qualitative term that expresses the confidence with which a data set can be compared with another. Strict adherence to standard sample collection procedures, analytical detection limits, reporting units, and analytical methods assures that data from like samples and sample conditions are comparable. This comparability is independent of laboratory personnel, data reviewers, or sampling personnel. Comparability criteria are met for the project if, based on data review, the sample collection and analytical procedures are determined to have been followed, or defined to show that variations did not affect the values reported.

To ensure comparability of data generated for the site, standard sample collection procedures were utilized by North Wind. Department of Toxic Substances Control (DTSC)-approved analytical methods were performed by Test America Laboratories. Similar methods and concentration levels to those used for previous sampling events also allow for comparable data. Utilizing such procedures and methods enables the current data to be comparable with previous and future data sets generated.

Sensitivity

Sensitivity is related to the ability to compare analytical results with project-specific levels of interest, such as risk-based screening levels or action levels. Analytical detection limits for the various sample analytes should be below the level of interest to allow an effective comparison.

Detection Limits

The method detection limit (MDL) study attempts to answer the question, "What is the lowest level of analyte in a sample that will result in a signal different than zero?" The study is based upon repetitive analysis of an interference-free sample spiked with a known amount of the target analyte. The MDL is a measure of the ability of the test procedure to generate a positive response for the target analyte in the absence of any other interferences from the sample.

The RL is generally defined as the lowest concentration at which an analyte can be detected in a sample and its concentration reported with a reasonable degree of accuracy and precision. For samples that do not pose a particular matrix problem, the RL is typically about three to five times higher than the MDL.

Laboratory results are reported according to rules that provide established certainty of detection and RLs. The result for an analyte is flagged with a "U" if that analyte was not detected, or qualified with a "J" flag if associated QC results fall outside the appropriate tolerance limits. Also, if an analyte is present at a concentration between the MDL and the RL, the analytical result is flagged with a "J," indicating an estimated quantity. Qualifying the result as an estimated concentration reflects increased uncertainty in the reported value.

Qualifiers were applied to applicable sample results by the laboratory and during the validation process based on sample results being reported as detected below the RL/MDL. Details of the validation and specific sample analytes qualified are discussed in the data validation reports.

In summary, for the collected groundwater samples, results for some of the analytes were qualified as estimated due to RL criteria. For the data validated in the 2018 groundwater sampling, RLs for a majority of the sample results were low enough to compare to the RL objectives stated in the WQSAP (Haley & Aldrich 2010a, 2010b). RLs above those stated in these documents are considered usable for project purposes.

Data Completeness

Completeness of the data collection program is defined as the percentage of samples planned for collection as listed in the WQSAP and Appendix B (Haley & Aldrich 2010a, 2010b) versus the actual number of samples collected during the field program (see Equation A).

Completeness for acceptable data is defined as the percentage of acceptable data obtained judged to be valid versus the total quantity of data generated (see Equation B). Acceptable data include both data that pass all the QC criteria (unqualified data) and data that may not pass all the QC criteria but had appropriate corrective actions taken (qualified but usable data).

Equation A.

$$\%\text{Completeness} = Cx\frac{100}{n}$$

Where:

C = actual number of samples collected
n = total number of samples planned

Equation B.

$$\%\text{Completeness} = Vx\frac{100}{n'}$$

Where:

V = number of measurements judged valid
n' = total number of measurements made

The overall completeness goal, as defined in the WQSAP and Appendix B (Haley & Aldrich 2010a, 2010b), for this sampling event is 90% for each analytical test for all project data.

The completeness goal achieved for acceptable data was 100% of the groundwater sample results for the number of measurements judged to be valid versus the total number of measurements made for all samples analyzed. No sample results were rejected. The completeness goal for the number of measurements judged to be valid was met for 2018 groundwater monitoring sampling. The data reported and not rejected are suitable for their intended use for characterization of groundwater in Area IV of SSFL.

Assessment of Data Usability and Reconciliation with the Site-Wide WQSAP Goals

One hundred percent of the data validated for the 2018 groundwater sampling, and reported in this quality assurance summary, are suitable for their intended use for site characterization. No sample results were rejected.

The RLs reported generally met the expected limits proposed by the analytical laboratories in their subcontract agreements with North Wind except for the analytes identified previously. Sample results that were qualified as estimated are usable for project decisions. The field duplicate precision criteria were met. Decisions based on results close to the RL should be made with a degree of caution.

The achievement of the completeness goal for the number of samples collected was met. The completeness goal for the number of sample results acceptable for use provides sufficient quality data to support project decisions for the wells that were sampled during this sampling event.

Attachment A

SDG and Field Sample ID Table

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SDG	Well or Piezometer ID	Sample	Analyses	QC
160-26868-1	PZ-105	PZ-105_021918_01_L	N	
	DD-145	DD-145_021918_01_L	N	
	DD-145	DD-145_021918_19R_L	N	Rinsate
	C-8	C-8_021918_19R_L	N	Rinsate
280-106589-1	TB	PZ-108_021918_78_L	V, G	Trip Blank
	PZ-108	PZ-108_021918_01_L	V, M	
	PZ-105	PZ-105_021918_01_L	V, M, G	
	DD-145	DD-145_021918_01_L	V, M, G	MS/MSD DRO
	DD-145	DD-145_021918_36_L	G	Field Duplicate
	RD-23	RD-23_021918_01_L	V	
	C-8	C-8_021918_01_L	V, M	
	RS	DD-145_021918_19R_L	V, M, G	Rinsate
	RS	C-8_021918_19R_L	V, M, G	Rinsate
	RD-21	RD-21_022018_01_L	V, P, M	MS/MSD VOCs
	RD-20	RD-20_022018_01_L	V, N	
	RD-20	RD-20_022018_36_L	N	Field Duplicate
280-106620-1	TB	RD-33B_022018_78_L	V, G	Trip Blank
	RD-33B	RD-33B_022018_01_L	V, P, M	
	RD-33B	RD-33B_022018_36_L	P	Field Duplicate
	RD-33C	RD-33C_022118_01_L	V, P, M, G	MS/MSD Perchlorate
	RD-63	RD-63_022118_01_L	V, G	
	RD-63	RD-63_022118_36_L	V, G	Field Duplicate
	RD-96	RD-96_022118_01_L	V, P, M, G	MS/MSD GRO
	RD-96	RD-96_022118_36_L	M, G	Field Duplicate
280-106660-1	TB	DD-139_022218_78_L	V	Trip Blank
	DD-139	DD-139_022218_01_L	V, P, M	
	DD-139	DD-139_022218_36_L	V	Field Duplicate
	DD-142	DD-142_022218_01_L	V, M	MS/MSD Metals
	PZ-109	PZ-109_022218_01_L	V	
	DD-144	DD-144_022218_01_L	V, M	
	DS-43	DS-43_022218_01_L	V, M	
280-106726-1	TB	DD-144_022218_78_L	V	Trip Blank
	RS	DD-144_022218_19R_L	V, P, M	Rinsate
	RS	DS-43_022218_19R_L	V, M	Rinsate
	DS-44	DS-44_022318_01_L	V, M	
	DS-47	DS-47_022318_01_L	V, M	
	RS	DS-44_022318_19R_L	V, M	Rinsate
	RS	DS-47_022318_19R_L	V, M	Rinsate

SDG	Well or Piezometer ID	Sample	Analyses	QC
280-106810-1	TB	PZ-120_022618_78_L	V, D	Trip Blank
	PZ-120	PZ-120_022618_01_L	V, M	
	RD-07	RD-07_022618_01_L	V, M	MS/MSD VOCs
	DD-143	DD-143_022618_01_L	V, M	
	DD-143	DD-143_022618_36_L	M	Field Duplicate
	RS	RD-07_022618_19R_L	V, M	Rinsate
	RS	DD-143_022618_19R_L	V, M	Rinsate
	RD-65	RD-65_022718_01_L	V, D	MS/MSD 1,4-Dioxane
280-106848-1	TB	DS-46_022718_78_L	G, D	Trip Blank
	DS-46	DS-46_022718_01_L	V, M, D	MS/MSD VOCs
	DD-140	DD-140_022718_01_L	V, M, D	MS/MSD Metals
	DD-140	DD-140_022718_36_L	V	Field Duplicate
	DD-141	DD-141_022718_01_L	V, P, M, G	MS/MSD GRO
	RD-29	RD-29_022718_01_L	V	
	RS	DD-141_022718_19R_L	V, P, M, G, D	Rinsate
	RS	RD-29_022718_19R_L	V, M	Rinsate
280-106860-1	TB	RD-98_022818_78_L	V, G	Trip Blank
	RD-98	RD-98_022818_01_L	V	
	RD-59B	RD-59B_022818_01_L	V, P, M, F	MS/MSD VOCs
	RD-59B	RD-59B_022818_36_L	M, F	Field Duplicate
	RD-59C	RD-59C_022818_01_L	V, P, M, F	MS/MSD Metals & Fluoride
	RD-59C	RD-59C_022818_36_L	V	Field Duplicate
	RD-59A	RD-59A_022818_01_L	V, P, M, F	
	RD-19	RD-19_022818_01_L	V, M, G, F	
	RS	RD-98_022818_19R_L	V	Rinsate
280-106873-1	FB	RD-34B_030118_19_L	G, P, M, N, F	Field Blank
280-106976-1	TB	RD-34B_030118_78_L	V, G, D, TCP	Trip Blank
	RD-33A	RD-33A_030118_01_L	V, M, P, F, D	
	RD-34B	RD-34B_030118_01_L	V, M,	
	FB	RD-34B_030118_19_L	V, G, D, TCP	Field Blank
	RS	RD-34B_030118_19R_L	V, M, F, D	Rinsate
	RD-54A	RD-54A_030118_01_L	V, P,M, G	
	RS	RD-54A_030118_19R_L	V, P, M, G	Rinsate
	RD-17	RD-17_030218_01_L	V, M	
	RS	RD-17_030218_19R_L	V, M	Rinsate
	RD-14	RD-14_030218_01_L	V, G, F, TCP	MS/MSD TCP
	RD-14	RD-14_030218_36_L	TCP	Field Duplicate

SDG	Well or Piezometer ID	Sample	Analyses	QC
	RD-34A	RD-34A_030218_01_L	V, M, G, F, D	
	RD-34A	RD-34A_030218_36_L	D	Field Duplicate*
	RD-34C	RD-34C_030218_01_L	V, M, F, D	
160-26903-1	RD-20	RD-20_022018_01_L	R, T	
	RD-33B	RD-33B_022018_01_L	R, T	
	RD-33C	RD-33C_022118_01_L	R, T	
	RD-63	RD-63_022118_01_L	R, T	
160-26984-1	RD-96	RD-96_022118_01_L	R	
	RD-95	RD-95_022218_01_L	T	MS/MSD Tritium
	RD-90	RD-90_022218_01_L	T	
	RD-90	RD-90_022218_36_L	T	Field Duplicate
	DD-144	DD-144_022218_01_L	T	
	RS	DD-144_022218_19R_L	T	Rinsate
	RS	DS-43_022218_19R_L	T	Rinsate
	DS-44	DS-44_022318_01_L	R	MS/MSD RAD (Except 901.1)
	DS-47	DS-47_022318_01_L	R	
	DS-47	DS-47_022318_36_L	R	Field Duplicate
	RS	DS-47_022318_19R_L	R	Rinsate
	RS	DS-44_022318_19R_L	R	Rinsate
160-27060-1	PZ-120	PZ-120_022618_01_L	R	
	RD-07	RD-07_022618_01_L	R	
	DD-143	DD-143_022618_01_L	R	
	RS	RD-07_022618_19R_L	R	Rinsate
	RS	DD-143_022618_19R_L	R	Rinsate
	DD-141	DD-141_022718_01_L	R	
	RS	DD-141_022718_19R_L	R	Rinsate
	RD-59A	RD-59A_022818_01_L	R	
	RD-59C	RD-59C_022818_01_L	R	
	RD-59C	RD-59C_022818_36_L	R	Field Duplicate
	RD-59B	RD-59B_022818_01_L	R	MS/MSD RAD (Except 901.1)
	RD-19	RD-19_022818_01_L	R	
	RD-98	RD-98_022818_01_L	R	
	RS	RD-98_022818_19R_L	R	Rinsate
160-27088-1	RD-33A	RD-33A_030118_01_L	R	
	RD-34B	RD-34B_030118_01_L	R	

SDG	Well or Piezometer ID	Sample	Analyses	QC
	FB	RD-34B_030118_19_L	R, T	Field Blank
	RS	RD-34B_030118_19R_L	R	Rinsate
	RD-54A	RD-54A_030118_01_L	R	
	RS	RD-54A_030118_19R_L	R	Rinsate
	RD-14	RD-14_030218_01_L	R	
	RD-34A	RD-34A_030218_01_L	R	
	RD-34C	RD-34C_030218_01_L	R	
160-32091-1	RD-59A	RD-59A_082018_01_L	R	
	RD-59A	RD-59A_082018_36_L	R	Field Duplicate
	RD-59C	RD-59C_082018_01_L	R	
160-30331-1	RD-33A	RD-33A-082118_01_L	R, T	
	RD-33A	RD-33A-082118_36_L	R, T	Field Duplicate
280-113433-1	RD-33A	RD-33A-082118_01_L	V, G, M, P, N, F, D, TCP	
	RD-33A	RD-33A-082118_36_L	V, G, M, P, N, F, D, TCP	Field Duplicate
	TB	RD-33_082118_78_L	V, G, D, TCP	Trip Blank
160-30373-1	RD-33C	RD-33C_082218_01_L	R, T	
	RS	RD-33C_082218_19R_L	R, T	Rinsate
280-113521-1	RD-33C	RD-33C_082218_01_L	V, G, M, P, N, F, D, TCP	
	RS	RD-33C_082218_19R_L	V, G, M, P, N, F, D, TCP	Rinsate
	TB	RD-33C_082218_78_L	V, G, D, TCP	Trip Blank
457885 (GEL)	RD-59A	RD-59A_082018_03_G	R	
	RD-59A	RD-59A_082018_03_G Dissolved	R	
	RD-59A	RD-59A_082018_03_36_G	R	Field Duplicate
	RD-59A	RD-59A_082018_03_36_G Dissolved	R	Field Duplicate
	RD-59C	RD-59C_082018_03_36_G	R	
	RD-59C	RD-59C_082018_03_36_G Dissolved	R	

Note: Sample ID table compiled from the chain-of-custody forms
TB = trip blank
RS = rinsate
FB = field blank

T = tritium
V = volatile organic compounds (VOCs)
G = gasoline range organics (GRO) and/or diesel range organics (DRO)
M = metals, P = perchlorate
N = nitrate as N, F = fluoride
R = radiochemical analyses
D = 1,4-dioxane
TCP = 1,2,3-trichloropropane

Attachment B

Data Validation Qualifier Definitions

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Inorganic Data Validation Qualifiers

Flag	Definition
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

Organic Data Validation Qualifiers

Flag	Definition
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.
NJ	Presumptively present at an estimated quantity (use with Tentatively Identified Compounds (TICs) only). A TIC is a compound not specified on the Target Compound List (TCL). A mass spectral library search is used to identify the compound.

Radiochemical Data Validation Qualifiers

Flag	Definition
	The analysis was performed, and radioactivity was detected (e.g., the radioanalytical result is statistically positive at the 95% confidence interval and is above its MDC). **NOTE:** *The radionuclide is considered to be present in the sample.*
U	The analysis was performed, but no radioactivity was detected (i.e., the radioanalytical result was not statistically positive at the 95% confidence interval and/or the result was below its MDC). The "U" qualifier flag is also applicable to any result reported as zero (0) (± an associated uncertainty). **NOTE:** *The radionuclide is not considered to be present in the sample.*
UJ	The analysis was performed, but the result is highly questionable due to analytical and/or laboratory quality control anomalies. The use of such a result is strongly discouraged. Analytical and quality control anomalies include such items as: significant blank contamination, known photopeak interferences and/or photopeak resolution problems, known matrix interferences, unacceptable laboratory control sample recoveries, serious instrument calibration problems, improper sample preservation, etc. The "UJ" qualifier flag could designate a possible false positive result in the case of a result that is statistically positive at the 95% confidence level. The "UJ" qualifier flag could indicate the result is considered an estimated non-detect (a non-detect that may be due to loss of analyte from lack of sample preservation, holding time exceedances, etc.). The specific use of the "UJ" flag is included by the validator in the text of the validation report. **NOTE:** *The radionuclide may or may not be present in the sample and the result is considered highly questionable.*
J	The analysis was performed, and radioactivity was detected (i.e., the radionuclide result is statistically positive at the 95% confidence interval and is above its MDC). However, the result is questionable due to analytical and/or laboratory quality control anomalies/ irregularities and should therefore be used only as an estimated (approximated) quantity. Analytical and/or quality control anomalies include such items as: laboratory duplicate imprecision, unsatisfactory analytical yields, insufficient laboratory control sample recoveries, unacceptable PE sample results, instrument calibration problems, improper sample preservation, etc. **NOTE:** *The radionuclide is considered to be present in the sample; however, the result may not be an accurate representation of the amount of activity actually present in the sample.*
R	The analysis result is unusable and was rejected due to severe analytical and/or quality control problems. **NOTE:** *The radionuclide may or may not be present, and the result is known to be inaccurate or imprecise.*